THE BRITISH JOURNAL

OF

TUBERCULOSIS

Vol. X. January, 1916. No. 1.

SYMPOSIUM.

WAR AND THE FUTURE OF THE TUBERCULOSIS MOVEMENT.

A COLLECTION OF REPRESENTATIVE OPINIONS.

War has harassed and handicapped the Tuberculosis Movement. The administrative difficulties, financial perplexities, and personal and public obstacles which still oppose progress are too well known to practical workers to require detailed enumeration. If the ground gained is not to be lost, there must be systematic and scientifically directed organization and adaptation of available powers to present necessities. It is the aim of this symposium to afford information and existing opinions which may prove of service in the national crisis.

From Sir THOMAS CLIFFORD ALLBUTT,

K.C.B., M.A., M.D., D.SC., LL.D., F.R.C.P., F.R.S.,

Regius Professor of Physic in the University of Cambridge; Physician to Addenbrooke's Hospital, Cambridge; Member of the Committee of National Research; Author of "Arteriosclerosis and Angina Pectoris," etc.

During the burden and sorrow of the war social methods which are completely organized will, generally speaking, be carried on as usual; organizations which were and are incomplete, and need therefore progressive as well as working energies, may suffer some set-back. The existing machinery will, in most cases at any rate, work on, but pioneer work may slacken, or even be suspended. These general remarks apply with some force to the tuberculosis campaign so far as it is still

a movement, and not already a system. The forward and tentative efforts, the exploring and persuasive parts of the campaign must almost necessarily slow down while energy is streaming away in other directions. It seems to me, therefore, that what we have now to do for tuberculosis is, in the first place, to secure our fixed machinery, and to insure so far a steady and regular efficiency; and although some considerable part of the pioneer work, of pegging out claims, will necessarily be delayed, or for a while even be arrested, we must not allow any part of our system to stand idle, or even to lose way.

On the working system of the campaign then there is little to be said, except on this keeping of the work in good heart and care that no part of it is hampered or neglected. Of the pioneer work, if we have necessarily to submit to some retardation, we must see where we can draw in our efforts at least disadvantage; and where, on the other hand, we cannot give ground without very grave losses in the future. What progressive or defensive efforts then will it pay the country best still to push, while submitting elsewhere to some inevitable check?

It seems to me, some other progressive movements being suspended, but the fixed machinery of cure (sanatorium and other) running as usual, that our best plan will be to push forward in the prevention of infection. Let us keep our grasp upon the future by concentrating such energy as may be at our disposal upon the "advanced cases" by which new infections are spread among the people. I fear that in this counsel I shall seem to be but reiterating an argument on which I have already often insisted; but at all times and places it seems to me to be very lame work to lavish our means upon systems of cure while day by day fresh infections are multiplying the victims of the disease. We are trying to fill a vessel with a hole in the bottom. Let us at least make surer of the "carriers," completing our statistics and our observations upon advanced cases, and our means and plant for dealing with them. Let us get over the social and customary hindrances to the due provisions for this end, an advance to be compassed by conversion of public opinion, and to be provided for by reasonable and not too despotic or elaborate measures of protection. Accommodation for advanced cases ought not to be expensive if provided, not by costly buildings and departmental machinery, but by relatively inexpensive and homely arrangements by local authorities. These patients should be not far from their friends; they should not be removed to distant palaces, nor cut off from the affections of family life. By homely quarters, kindly and instructed guardians, and very moderate demands upon skilled attendance, the evils of promiscuous herding of the advanced cases in crowded and often not very cleanly houses can be prevented, and these patients placed in comfort for

themselves and in safety for their fellows. Such modest efforts even a state of war should not forbid. For these cases large and costly buildings, and that kind of institutional life which becomes after a while so tiresome and heartless for the sufferers, are, for purposes of prevention, unnecessary and wasteful.

FROM E. W. HOPE,

M.D., D.SC.,

Medical Officer of Health for the City and Port of Liverpool; Professor of Public Health in the University of Liverpool; Ex-President of the Association of Medical Officers of Health; Hon. Secretary, Royal Institute of Public Health; Author of "Manual of School Hygiene," etc.

A reference to the policy adopted by Liverpool will probably afford some help in indicating lines which are likely to prove of service in other cities. Before the outbreak of war the work of the Tuberculosis Department of this city could be conveniently divided into the following sections: (1) The examination of patients with a view to diagnosis; (2) treatment at the various tuberculosis institutes; (3) investigation into applications for extra nourishment; (4) the visiting of patients to ascertain their fitness to enter a sanatorium; (5) the examination of patients discharged from a sanatorium for the purpose of arranging a continuance of treatment at home or at a dispensary; (6) the re-examination every three months of patients in receipt of domiciliary treatment; (7) the examination of contacts. It is quite apparent that a depleted medical staff would entail the elimination of the work of some of these sections, or at least its curtailment; obviously, it is desirable to retain in full working order such sections as are essential to the scheme. The work involved under Sections 1, 2, 3, and 4, has been carried out in its entirety.

Examination for the purpose of diagnosis is essential, and measures for treatment cannot be curtailed in a scheme which embraces non-insured and non-dependent persons who have no panel doctors and cannot afford to pay a practitioner's fees; without preliminary investigations the grants of extra nourishment are open to grave abuse; and, finally, delay in admission to a sanatorium subsequent to the initial examination renders it very desirable to ascertain present condition of patients before they undertake the necessary journey to an institution. The work involved in Section 5, dealing with "after-care," has been curtailed by the expedient of placing the patients in touch with their panel doctors through letters addressed to the doctors and the patients, leaving it to the practitioners to suggest further examination on the part of the Tuberculosis Officer, when in his opinion such is specially indicated. Similarly, the work of

Section 6 has been curtailed by omitting this re-examination except in cases in which the practitioner informs the department that he specially desires it. The examination of contacts has also been curtailed, invaluable though we know this work to be, and it is now restricted to the cases which are known to live in grossly insanitary surroundings. It is felt that action in regard to tuberculosis has been cut down to its utmost limits, and further curtailment would altogether jeopardize its usefulness.

FROM A. MAXWELL WILLIAMSON,

M.D., B.SC.,

Medical Officer of Health to the City of Edinburgh.

The exigencies of the present time certainly seem to indicate some reconsideration of the question of treatment of patients suffering from tuberculous disease as provided for under the recent Insurance Act. The circumstances within the brief period since the Act came into force have materially altered, so much so indeed that had it been possible to foresee them, the provisions of the Act would have been in many respects materially different. Whatever view may be held as to the value of sanatorium treatment, or as to whether or not the results attained are commensurate with the enormous outlay entailed, it seems highly desirable that, meantime at least, serious consideration should be given to the whole question of that particular line of treatment which hitherto has been popular with the profession and the public. During the first eighteen months since the introduction of the Act over 26,000 persons in the United Kingdom have been treated in sanatoria. Of these, 14,000 have been discharged "improved," while the remainder have died, been discharged without improvement, had their treatment discontinued, or were still continuing treatment at the date of the available record, January, 1914. In addition to those cases there have, of course, been large numbers who have received domiciliary treatment, and the outlay under both headings reaches the enormous total of £836,500. It is not possible to differentiate the cost entailed in carrying out these two lines of treatment. Some light, however, is thrown on this subject by the experience gained in this city of Edinburgh. From the commencement of the Act, until the end of September, 1915, 625 insured persons received sanatorium treatment at a cost to the Insurance Committee of £12,900, representing an actual outlay per patient of £20 12s. 9d.

In considering the present situation, three facts must be borne prominently in mind: (1) The enormous outlay in money just referred to; (2) That patients on their discharge, even when "improved" in

health, return to precisely the same home conditions from which they were originally taken; and (3) The present and prospective difficulty in obtaining qualified assistance for the work in hospitals and sanatoria. It seems desirable, therefore, that for the moment at least, treatment in sanatoria should be strictly limited to a few selected cases, say, in the very early and latest stages, and that domiciliary treatment *in fact* rather than *in name* should now be heroically carried out. Money laid out on comforts for the patients is satisfactory up to a point, but tends toward an attempt to "cure," rather than to prevent, tuberculosis. Such treatment, carried to its logical conclusion, should entail, where necessary, the provision of an additional room for the sole occupation of the patient; an additional bed, where necessary, and a supply of utensils, disinfectants, etc., which are not always available. It is just along this line of action that the voluntary aid rendered in some communities by the establishment of "After-Care" Committees seems to give promise of much more lasting benefit than is ever likely to be attained by the present lavish expenditure of money on treatment in sanatoria.

From J. C. THRESH,

M.D., D.SC., D.P.H., F.I.C.,

Medical Officer and Chief Tuberculosis Officer to the County of Essex; late Lecturer on Public Health at the London Hospital Medical College.

The chief difficulties which arise in connection with tuberculosis work are due to two authorities having control. When the County Council has absolute control and the Insurance Committee pays over the whole of the 9s. per head now supposed to be available for dispensary and sanatorium treatment, these difficulties will be surmounted. The Local Government Board should permit all notifications of tuberculosis to be sent to the tuberculosis officers by the Medical Officer of Health, and give them power to visit, on receiving his instructions, without the tuberculosis officer being appointed Assistant Medical Officer of Health.

From H. HYSLOP THOMSON,

M.D., C.M., D.P.H.,

Deputy Medical Officer of Health and County Tuberculosis Officer for Hertfordshire; Late Medical Superintendent of the Liverpool and Bridge of Weir Sanatoria; Author of "Consumption in General Practice," etc.

The effect of the war has been to dislocate schemes for the treatment of tuberculosis which, prior to the outbreak, were approaching completion, and definitely to arrest those in the process of formation. It is desirable, therefore, in view of the urgent call for economy, and in consequence of the serious depletion of public health and tuberculosis

staffs, to review to what extent present arrangements can be so conserved as to meet the more urgent requirements for prophylaxis and treatment during a possible period of four or five years. In considering how the many-sided demands of the present situation may be most efficiently and economically met, it is essential, while giving all due regard to the question of economy, to keep in mind the vital importance of questions relating to public health at the present time, and to endeavour to hold the balance equally between the requirements for treatment and the call for prophylactic measures. Where both can be met by one and the same procedure, such should be acted upon. For this reason the work in connection with tuberculosis should be conserved round the dispensary and the tuberculosis hospital. The dispensary system is relatively economical, and it provides treatment for early and afebrile chronic cases, while at the same time acting as an educative centre in relation to prophylaxis. The depletion of medical and nursing staffs of dispensaries may give rise to difficulty, but this could temporarily be overcome by utilizing the services of local medical men and nurses. The provision of hospital beds for acute and advanced cases of tuberculosis is most important, as it combines treatment and prophylactic measures. While sanatorium accommodation may justifiably be curtailed at the present time, there should be no cutting down of hospital accommodation; rather should it be provided where non-existent. Sanatorium accommodation, especially as viewed by some sanatorium authorities, is much too exclusive for the present time of stress and strain. The present crisis does not admit of too rigid adherence to former views as to the provisions of accommodation according to type, or a too careful consideration for the psychological peculiarities of the consumptive; moreover, hospital beds can temporarily be utilized for early cases, which, owing to well-marked auto-inoculation, require a period of rest in bed. It may be necessary, therefore, in certain districts where the schemes are yet incomplete, to provide hospital treatment, either by means of special hospital accommodation or by the temporary transforming of sanatorium into hospital accommodation. This will broaden the basis of treatment and offer increased facilities for preventive effort. Evidence is not lacking that a considerable percentage of men who have latent and arrested tuberculosis have enlisted. The effect of modern trench warfare, with its exposure to damp, cold, fatigue, inhalation of noxious gases, etc., will be to activate latent tuberculous foci. Many of the soldiers discharged from the army on account of tuberculosis will be found to be suffering from the disease in acute form, for which hospital treatment is essential. For prophylactic reasons alone, though other reasons might be given, it is necessary so to conserve our efforts that accommodation for the hospital treatment of discharged soldiers will be immediately available.

FROM HERBERT DE CARLE WOODCOCK,

M.D., M.R.C.P.E., M.R.C.S., D.P.H.,

Member of the Council of the National Association for the Preventon of Consumption; Author of "The Doctor and the People," etc.

The wastage of war is so great that every means that will insure the health of the next generation must, on national and imperial grounds, be adopted. How shall we do twice the work with half the means? The crusaders will have many supporters, for the military age is the vulnerable age for tuberculosis: consumption and Lord Derby grasp at the same years. Tuberculosis, it must be remembered, is an international question; especially is it a subject which has been deeply studied by the English-speaking races. Are the English people likely to allow the work which has begun in organized effort to end in a *débâcle?* Some months ago an English working man was allowed to go to France and visit his mates in the trenches. He was bewildered by the animus against his country. At his hotel he turned on a traducer, an Englishman, of course, who, having made money out of the war, was bemoaning the little that England was doing. Our workman's wrath boiled over; he poured out fact after telling fact, speaking of the eleven hundred munition factories, of the Imperial Navy, and of the Army, which is in itself an empire. French listeners crept up, their bearing entirely changed; hands were held out to grasp his, and he was finally carried off by the repentant traducer to a club, where, with the help of two interpreters—for he was a Yorkshireman—he did his bit to save his country's credit. The bearing of these remarks lies in the application of them. This working man is the chairman of an insurance committee, and is especially interested in the tuberculosis question, and his aggressive energy will continue when the war is over. Is it likely that such men will allow the citizen who has been a soldier, having escaped the arrow that flieth by day, to succumb to the pestilence that walketh in darkness and to the sickness that destroyeth in the noonday? I myself have brought forward from time to time suggestions which, though not immediately leading to a lessened expenditure, would certainly end in a larger economy. The problem of one city is not that of another. In Leeds we are destroyed by the dust that falls, and we read the burial service three years before the funeral. In Edinburgh milk is said to be a main cause of tuberculosis. The many eyes of the medical officer of health should see into every factory, every workshop, and every house, and his powers should not be enviously spied on. The mob method of filling our sanatoria should cease. One method of reform would be to separate the spitters from the non-spitters; for the precautions necessary and the treatment advisable

differ greatly. The old, broken-down pulmonary cirrhotic is not benefited by sanatorium treatment; cold air is not a stimulus to chronic degenerates—they need different methods. Tuberculous children require special wards, special hospitals, and special schools. The co-operation of the general practitioner should be secured. The general practitioner is the first clinical tuberculosis officer to see the patient, and if he has no expert knowledge we do not get the cases in time. He should therefore be taught in our tuberculosis dispensaries, and, assisting as he would in the work, he should be paid. A clinical assistantship of six months' duration would allow a large number of practitioners to pass through the dispensary and to emerge equipped to be valuable supporters. This is, of course, for the future; but it is too important not to be mentioned now. As to domiciliary treatment: night shelters, day shelters, after-care committees have hardly been tried in England; they are most valuable, and they are most economical. Every sanatorium near a city should have its out-patients. By these means the educational, missionary, and preventive work—and these three are one—would flourish. There are many points I have not touched on: the question of overlapping is very important, so is concentration on those cases which can most benefit by sanatorium treatment. Economy is greatly needed. But, as the Bishop of Wakefield has well said, "In God's name, let us not have too much economy, or we shall do irreparable harm to the rising generation."

FROM JANE WALKER,

M.D.,

Medical Superintendent of the East Anglian and Maltings Farm Sanatorium, Nayland, Colchester; Member of the Departmental Committee on Provision for the Treatment of Tuberculosis; Member of the Government Advisory Committee on Research.

There is a danger at the present time of making *physical* efficiency the only standard worth considering. If a man cannot fulfil the arduous tasks required of a soldier, such as long, fatiguing route marches when laden with a considerable weight of equipment, or if he is not fleet enough as a runner to hurry to the rescue of the occupants of a falling airplane, he is regarded as useless for present purposes, and he, also, himself is very much inclined to so regard the situation. In the same way, women who cannot undertake the rigours of work in a munition factory consider the world has no further use for them, and they are "better dead." It is one of the evils of war that it takes us back behind the great principles and practices of civilization, and makes us allow the weakest to go to the wall. Indeed, really humane people have suggested that the whole tuberculosis movement should be

"scrapped." And within limits this is wise. It would be extravagant and foolish expenditure at the present moment to lay out money on building new sanatoria for adults, though it would be a real economy to provide residential sanatorium schools for tuberculous children. Every effort, indeed, ought to be made to save all the children from babyhood upwards. Sufficient dispensaries should be provided throughout the country, at which consumptive persons could attend for advice and treatment. This should, however, be only one of the functions of a tuberculosis dispensary, which should include a staff of health visitors and an efficient active after-care committee, the members of which would be expected to do some real work, and each act as "guide, philosopher, and friend," to delicate children and their parents, and be prepared to visit those homes where an inmate, adult or child, has been away for treatment, either at a colony and sanatorium or at a school. The institutional treatment of tuberculous adults requires to be considered under three heads: (1) Early cases (*i.e.*, those with little or no physical signs of tuberculous lesions and no fever) should be treated in colonies, where (after a very short preliminary time and observation, preferably carried out in connection with the dispensary, which should be regarded as a "clearing-house") the inmates might be employed on remunerative work on the lines of Dr. Chapman's experiment at Coppins Green, Clacton, some years ago. Existing sanatoria could draft off their early cases into such a colony. (2) Moderately developed cases should be treated in existing sanatoria as at present, and many of them would gradually come into the colonies and fill up the gaps when the members of Class 1 returned to ordinary work and life. (3) The advanced and incurable cases should be treated apart from patients dying from other diseases, and arrangements might be made with existing institutions to provide simple, cheap accommodation for such cases.

From J. J. PERKINS,

M.B., F.R.C.P.,

Hon. Secretary to the National Association for the Prevention of Consumption and Other Forms of Tuberculosis.

The declaration of war came upon the National Association for the Prevention of Consumption and Other Forms of Tuberculosis when the sphere of its activities was widening. At that time the programme of the caravan tours was full for the ensuing six months, including visits to the Midlothian district, Buckinghamshire, Hertfordshire, Gloucestershire (Stonehouse district), and Kent. The after-care propaganda was being vigorously and successfully pushed, while the conditions created

by the National Health Insurance Act were providing extensions for the Association's work in many directions. Unfortunately, this promise has not been entirely fulfilled: the Association, in common with other philanthropic societies, has suffered from the war, in consequence of which anti-tuberculosis work in some respects has been curtailed. In spite of the difficulties occasioned by the present crisis, the Association has continued its efforts, by lectures, to maintain public interest in the problems which can never for long be lost sight of. Recently there has been undoubted evidence of a reawakening interest. The Approved Societies are realizing the importance of the various questions of tuberculosis. Especially is this so with regard to the necessity for the care of those who have received sanatorium treatment, and in whom it is necessary to take steps to prevent relapse. In this work the Association is co-operating with the Approved Societies, as the question is one to the importance of which it has for some years been devoting special attention, and which it has been pressing on its branches as the most promising field of work for voluntary effort. For some years a permanent Committee has met to deal with the subject. Suitable home surroundings and suitable work must be found for these cases, and the supervision of their health kept up by such means as the provision of an extra room, an extra bed, or a shelter and extra food supplies, to mention only a few of the points arising.

From Sir JOHN W. BYERS,

M.A., M.D., M.A.O.,

Professor of Midwifery and of Diseases of Women and Children in the Queen's University of Belfast; Physician for Diseases of Women to the Royal Victoria Hospital, Belfast; and Physician to the Maternity Hospital.

I think nothing beyond the measures at present in operation can be attempted for dealing with tuberculosis until the termination of the war. When, however, that happy time comes, we must surely ask ourselves: if the magnificently organized sanitary service of the R.A.M.S. has kept our soldiers in France and Flanders practically free from such preventable diseases as typhus, enteric, and dysentery, why can we not get rid of tuberculosis at home by a more carefully organized and a more highly specialized Public Health Crusade? Surely the lessons learned in France and Serbia must influence us in dealing at home with a preventable disease like tuberculosis.

FROM MAJOR WALDORF ASTOR,

M.P.,

Chairman of the Departmental Committee on Tuberculosis; Treasurer of the State Medical Research Committee.

The daily publication of casualty lists must make it obvious to all that we cannot afford to slacken in our efforts to reduce the mortality from tuberculosis. On the contrary, we must redouble all efforts to grapple with a disease which can largely be prevented.

ORIGINAL ARTICLES.

CRIPPLED TUBERCULOUS CHILDREN:

A CONSIDERATION OF CERTAIN PRINCIPLES GOVERNING THE CORRECTION OF DEFORMITY IN TUBERCULOUS DISEASE OF THE SPINE AND THE HIP, AND ILLUSTRATED BY REFERENCES TO SELECTED CASES.[1]

By H. J. GAUVAIN,

M.A., B.C. (CANTAB.), M.R.C.S., L.R.C.P.,

Medical Superintendent of the Lord Mayor Treloar Cripples' Hospital and College, Alton, Hampshire.

Amongst the problems which have to be considered by those who are entrusted with the care of children, and older cases suffering from surgical tuberculosis, few present greater interest, and none give greater opportunity for the exercise of ingenuity, than those associated with the correction of the varied deformities which such patients are so prone to acquire.

The Occurrence of Deformity in Tuberculous Disease.

The treatment of these cases is by no means limited to the employment of measures designed for the correction of deformity, but it is with their orthopædic requirements that I am now alone concerned, and with which I propose to deal. For success to be attained in the correction of deformity, it is essential that each case to be treated is individually studied, and the reason for each divergence from the normal appreciated and countered by the application of methods of correction not only in themselves mechanically sound, but also able to act effectively within those restricted limits which the presence of a causative and associated disease prescribes. To illustrate my meaning, one may refer to traumatic dislocation at the hip-joint. This may be reduced by the exercise of force suitably applied, and which need only take into consideration the fact that the head of the femur is outside the acetabulum, and the necessity that it must be replaced. The correction of pathological dis-

[1] The illustrations accompanying this paper are reproductions from photographs taken by Mrs. H. J. Gauvain. They are reproduced from the "Report on the Medical Work of the Lord Mayor Treloar Cripples' Hospital, Alton, Hampshire," recently published by Messrs. Horace Marshall and Son, Temple House, Temple Avenue, London, E.C. Price 1s. net.

location at the hip-joint secondary to tuberculous disease may be only safely attempted by bearing in mind that not only is there a dislocation, but that dislocation has occurred in a joint that is itself diseased, and that dislocation is the result of the disease. Hence, the mechanical means to be adopted, if correction of the deformity is to be attempted, are limited to those methods which our experience has taught us may be safely employed in a joint which is itself diseased. Moreover, it is desirable that such methods of correction

FIG. 1.—ACUTE TUBERCULOUS DISEASE OF THE SPINE, WITH DOUBLE PSOAS ABSCESS AND CONSIDERABLE DEFORMITY.

of the deformity as are employed shall not only be free from danger, but also shall be so designed that they will of themselves tend to assist in the amelioration of the disease. Again, not only are the means to be adopted for the correction of existing deformity restricted by the presence of disease, but they must vary within narrow limits with each particular phase of the disease. Too strong emphasis cannot be laid upon the ever-changing limitations which are imposed upon the orthopædic requirements of any given

case due to the varying nature of the causal factor of the deformity. It is these variations and limitations which constitute at the same time the difficulties of, and the great interest in, the orthopædic treatment of surgical tuberculosis.

A detailed consideration of these varying factors is out of question here, but they may, perhaps, be best illustrated by reference to the needs of special cases selected for comment. It is in the hope that reflection may be aroused in those who are in the habit of practising regular and routine treatment in such cases entrusted to their care that these lines are penned.

Recumbency, followed by the application of some form of spinal support, and left to the ignorant skill of the instrument-maker, will

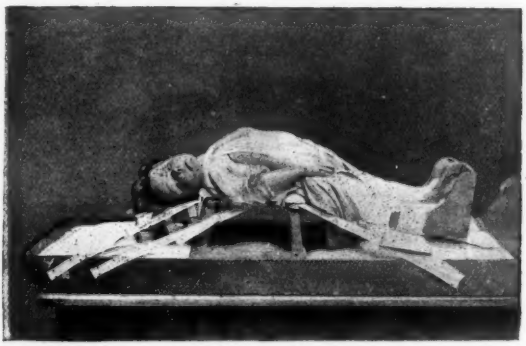


FIG. 2.—THE "WHEELBARROW SPLINT," SPECIALLY INDICATED IN SPINAL CARIES WITH MODERATE DEFORMITY AND MUCH MUSCULAR SPASM.

never correct deformity in Pott's disease, and still less may be expected from the Thomas hip-splint—the most commonly employed apparatus in England for tuberculous disease of the hip-joint.

CASE I.—*A Patient suffering from Acute Dorso-lumbar Caries, with Double Psoas Abscess.*—A. B. (see Figs. 1 and 3), aged seven years, was admitted suffering from acute tuberculous disease of the spine, with double psoas abscess, and increasing deformity. Fig. 1 shows the characteristic attitude adopted by such a patient when standing. To maintain the erect position, he has to support himself by resting his hands on his thighs. The muscles investing the spinal column are in a condition of protective spasm, which keeps the spine rigid, and is in itself one of the most important factors in the production of angular curvature.[1] The thighs are

[1] This is denied as a cause for the production of angular curvature of the spine by some, but without going into my reasons for making this assertion, I would repeat that, in my opinion, it is the most important factor in the production of such deformity, and sometimes the sole factor.

flexed partly in the endeavour to maintain the erect attitude, but largely because of spasm of the psoas muscles, which in the case now under consideration has proceeded further, and resulted in the formation of abscesses. These abscesses, proceeding from the spinal lesion, have invaded the substance of each psoas muscle. The head is thrown backwards in the effort to maintain the balance. The antero-posterior diameter of the thorax has increased and is increasing, the sternum is becoming carinate, and the viscera are becoming displaced. The patient is in constant pain of a dull, aching character, becoming at times acute, particularly if he is subjected to any jar or hasty movement. He is in constant discomfort of a nature difficult to describe, but which is, perhaps, best summed up in the expression "on edge." Referred pains, particularly in the gastric region, are common. His gait is characteristic. He walks with extreme care, not relaxing his muscles for one instant, fearing the pain which will inevitably follow some unguarded movement. Hence, his face assumes a pinched and anxious expression. His appetite fails, and his general condition gets rapidly worse. The emaciation becomes marked, and the absorption of poisonous products from the lesion and abscesses produces a profound cachexia.

With such a patient as is here described, neglect of treatment will result in almost inevitable death. The abscess will probably burst, become infected, and the most probable immediate cause of dissolution will be septic exhaustion, which, if prolonged, will be followed by amyloid disease. Inefficient treatment may result in eventual arrest of the disease, but will leave an enfeebled and exhausted patient, who will be a permanent cripple. Correctly planned treatment gives sure promise of complete success. To operate on such a case is almost as bad as to leave the patient neglected.

The disease being acute and progressive, the first indication is complete and absolute rest. Mere recumbency is insufficient. Immobilization of the spine is essential. To correct the deformity, the spinal rigidity must be overcome, the spine put "on the stretch"—in other words, *gradually* hyperextended—the patient meanwhile remaining recumbent and immobilized. The psoas muscles being also involved, they, too, must be kept stretched and at rest.

All the requirements of such a patient are met by the employment of such an apparatus as the "wheelbarrow splint."[1] On it he may remain fixed, at rest, and progressively hyperextended for an indefinite period. The "back-door," which is an essential part of the apparatus, allows the spine to be progressively hyper-

[1] Gauvain, "The Mechanical Treatment of Spinal Caries," *Lancet*, March 4, 1911.

extended at the region where such hyperextension is called for, and leaves the back readily accessible. The legs are strapped down on to conveniently attached, adjustable back splints, and thus the psoas muscles are kept stretched and still. Foot-drop is avoided by adjustable foot-pieces, which are figured in the accompanying

FIG. 3.—A. B., THE PATIENT ILLUSTRATED IN FIG. 1 SIX MONTHS AFTER DISCHARGE WITH DISEASE ARRESTED.

The child's general condition shows the degree of improvement; the abscesses have been successfully aspirated and the deformity almost completely corrected.

illustration (Fig. 2). Simultaneously with this treatment, the abscesses are carefully aspirated according to the technique described elsewhere.[1] The tension inside the psoas muscles diminishes, and the fibrous wall, which constitutes the boundary of the abscess, being only punctured, is otherwise maintained intact. This fibrous zone of resistance, which forms a natural barrier to the spread of the

[1] Calvé and Gauvain, "The Treatment of Tuberculous Abscesses of Bony Origin by Conservative Measures," *Lancet*, March 5, 1910.

disease, is thus preserved, and, being relieved of the strain thrown upon it, is relatively stronger. New fibrous tissue forms inside the abscess, and, as it ages, shrinks and draws the abscess wall ever nearer to the causative lesion. The surrounding muscle, into which the abscess was encroaching, recovers. Eventually, a fibrous mass alone represents the area previously occupied by tuberculous

FIG. 4.—A GIRL, AGED 9, SUFFERING FROM SPINAL CARIES ASSOCIATED WITH LATERAL AS WELL AS ANGULAR CURVATURES.

FIG. 5.—THE SAME CHILD WITH DISEASE ARRESTED, LATERAL CURVATURE CORRECTED, AND ANGULAR CURVATURE MUCH REDUCED.

débris, and when the need for its protection no longer exists, it, too, becomes absorbed and disappears, and healthy muscle again occupies the region from which such muscle had been displaced. The abscess has been cured by stimulating and enlisting those natural defensive forces which meddlesome surgery would have injured or destroyed.

Meanwhile, the progressive hyperextension has gradually tired out and caused to relax the irritated muscles which invest the vertebral column. Nature's hint that rest is needed to the lesion has been taken, but by the adoption of means which are not available to unaided nature, and which avoid all drawbacks. With the relaxation of the muscles, the spine gradually straightens out and the deformity diminishes. Pain is abolished, the pinched and anxious facial expression previously remarked is replaced by an

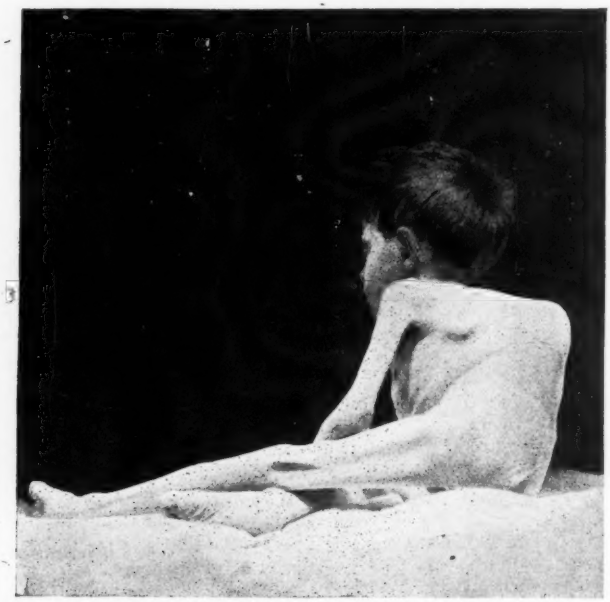


FIG. 6.—A BOY WITH NEGLECTED SPINAL CARIES AND EXTREME DEFORMITY.

expression of ease and content. The appetite improves. With the diminution of the abscess there is corresponding lessening of toxæmia, and the resulting cachexia. This cachexia is a measure of the amount of toxæmia, and, as such, is a valuable index.

How long should such treatment as just described be continued? It should be continued until there is definite evidence of the arrest of the disease, except under particular circumstances, which cannot be detailed here. To suggest a definite period for this method of treatment is useless. The time depends upon a complex of conditions which must be severally weighed and

balanced. Of these, the most important is the absence of spasm of the spinal muscles, and consequent loss of spinal rigidity. The estimation of this requires judgment and experience. It is best investigated by dorsi-flexing the thighs separately and together, with the patient ventrally recumbent. Full relaxation of the psoas muscles rarely occurs simultaneously. The spine should be freely and painlessly movable passively, as in health, in all directions, except at the site of the disease. Pain and tenderness should be absent. Gross deformity should have disappeared. Cachexia will usually be absent. Abscesses should not only be not palpable, but not discernible on radiographic examination, unless calcification has occurred. X-ray photographs will often show recalcification of the spinal lesion. The temperature record of the patient is of little value in influencing decision, because pyrexia will have been absent long before this stage of treatment should be abandoned. In discussing these findings, I am alluding to the simple typical case. There are noteworthy exceptions, which cannot be here considered, but these simply serve again to direct attention to the importance of the exercise of judgment directly applied to each individual patient—a point which cannot be too strongly emphasized or laboured.

There being the clearest evidence that the progress of the disease is definitely arrested, it must be remembered that the site of the lesion is still the weak spot in the spine. All the good hitherto accomplished may be undone unless careful treatment is maintained. The lesion must be consolidated. The deformity is, however, now sufficiently corrected for practical purposes, and subsequent treatment need not be referred to in this place. The slight residual deformity remaining may be obliterated by appropriate measures, but such further correction, though proper in a private patient, is not justifiable in a hospital case, for reasons which should be sufficiently obvious. Fig. 3 reproduces photographs taken six months after A. B.'s discharge. During that period he had been receiving no treatment whatever. The child's general condition shows the degree of improvement. The deformity is almost completely corrected—for practical purposes it is completely corrected—the disease is arrested, and there is no indication of relapse.

Case II.—*A Patient suffering from Dorso-lumbar Caries, with Lateral as well as Angular Curvature* (Fig. 4).—Lateral curvature, associated with angular curvature, and the result of tuberculous disease of the spine, is somewhat uncommon. When the sequel to spinal caries, and not due to other causes, it may be successfully treated orthopædically in essentially the same way as described for Case I. Modifications in such orthopædic treatment

will suggest themselves, and may be conveniently used to shorten the period of treatment required, but they are not of sufficient importance to justify separate consideration. Fig. 5 shows that the end results of a case of this description are entirely satisfactory.

CASE III.—*Neglected Dorsal Caries, with Extreme Deformity* (Fig. 6).—The degree of deformity in this case is such that the means employed in the previous instances would be quite inefficient, mechanically incorrect, and both painful and dangerous in application if attempted. If, in the example under consideration, the disease is very acute, and the deformity, though extreme, is recent, measures may be usefully employed which will have a direct effect on diminishing the deformity. If, on the other hand, the disease appears to have run its course and be now quiescent if firm ankylosis has taken place, then attempts to correct the primary deformity—by which I mean the deformity which is the actual direct result of the disease—are not only inadvisable, but would be dangerous.

Good lateral skiagrams are of great assistance in aiding decision on the line of orthopædic treatment to be attempted. If such skiagrams show a mass of necrotic material in the concavity of the primary deformity, with possibly extensions in the form of a psoas or other abscess, it is probable that a considerable degree of ankylosis has not taken place. If, on the other hand, the remains of the partially destroyed vertebræ are clearly visible, there is little pus, the injured vertebræ are obviously bound down to each other by old tough fibrous tissue, then attempts at correction of the primary deformity will be attended with grave danger. If made, they will necessitate the application of considerable force, the fibrous binding material will be first stretched, then probably ruptured. The disease will very likely reactivate. At the best, local abscess formation is likely to take place, while more probably general dissemination will occur, and the life of the patient be seriously endangered.

In the first instance, the disease is probably not of long duration, the patient has been inefficiently treated, but he has good powers of resistance, as evidenced by the extreme degree of muscular spasm, which has been largely instrumental in producing such marked deformity. It is obvious that both recumbency and immobilization must be enforced. If a tracing be taken of such a patient's spine, and the curves thereon analyzed, it will be observed that the appearance of the true deformity is markedly accentuated by the compensatory curves above and below the lesion. These secondary curves are safely and easily susceptible to correction, and, assuming that they can be fully straightened out, we are left with a rod with one more or less acute angle in its course. Carefully applied and adjusted traction on each end of the rod in the

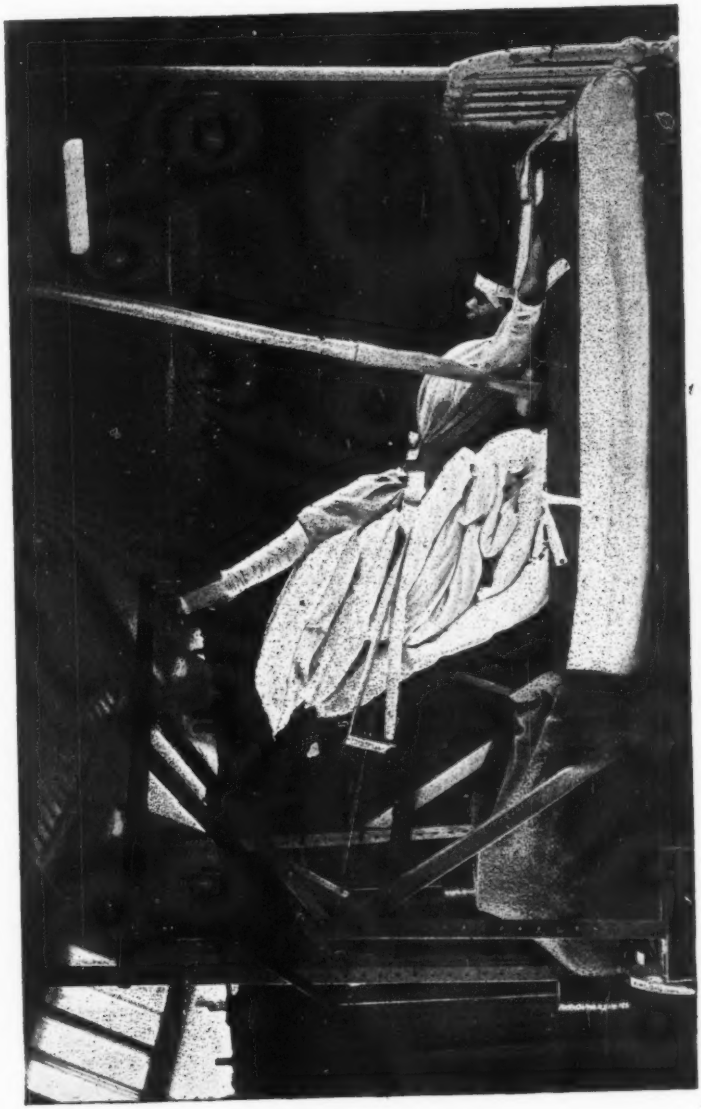


FIG. 7.—A FORM OF APPARATUS SOMETIMES APPLIED FOR CORRECTION OF SEVERE DEFORMITY.

direction which the rod points, and pressure on the convexity of the angle, will be forces acting mechanically to the greatest advantage in straightening out such an angle. Fig. 7 shows how such a principle can be applied to the correction of a severe degree of angular curvature of the type just described. This method of orthopædic treatment is highly efficient in suitably selected cases, but it cannot be urged too strongly that it is a method not to be lightly undertaken; that the cases in which it is employed should be selected with the greatest care; and that the apparatus must be skilfully applied and adjusted. It is a method involving considerable trouble, and, whilst its employment in suitably selected cases is attended with a high degree of success, in unskilled hands it may lead to disappointment, and is not without danger.

In the second instance, where the arrested disease leaves the patient with a very considerable degree of ankylosed deformity, direct attempts at its correction should be avoided. Much—indeed, very much—may be done from an orthopædic standpoint. The patient should be suitably suspended by the head from a gallows. The point of traction on the head must be selected with the greatest care, and must be such that the compensatory curves are to the fullest degree possible obliterated. To the trunk of the patient thus suspended is applied a properly designed and moulded plaster jacket, which maintains the spine in the corrected position with the appearance of minimum deformity. To illustrate this usefully, too extensive a series of reproductions of photographs would be required for the space at my disposal. Such photographs I have, however, which are free to the inspection of those interested. The patient must be later educated to maintain his trunk in the corrected position. The improvement in successfully treated cases is so striking as to be little less than amazing, even though the primary deformity has only been modified in the slightest degree. The patient benefits not only in appearance (and this is a matter of great importance, particularly if his livelihood depends upon his own efforts), but also in his general health, because viscera previously displaced resume their more nearly natural position, and their proper functions are retained unimpaired. Natural growth and development is facilitated, and the patient's prospects and outlook on life completely altered for the better.

In the next number of this journal I hope to complete this study with a consideration of certain elementary principles governing the correction of deformity in selected cases of tuberculous disease of the hip-joint in young subjects.

THE DESTRUCTION OF TUBERCLE BACILLI IN MILK BY ELECTRICITY.

By Professor J. M. BEATTIE, M.A., M.D.,
Dean of the Medical Faculty and Professor of Bacteriology in the University of Liverpool,
AND
F. C. LEWIS, F.C.S.,
Assistant Lecturer in Bacteriological Methods, University of Liverpool.

We have now completed a series of experiments on the treatment of tuberculous milk by electricity on the lines which have been described by us in a Report to the Health Committee of the City of Liverpool, and in various communications to scientific journals. These seem to us to establish fully the claims we have made, that this process is efficient for the total destruction of the bacillus of tuberculosis in a milk-supply. Reference to recent experimental investigations will help to make this clear.

1. Experiments on Naturally Occurring Tuberculous Milk.

Our experiments were carried out under the following conditions: (*a*) Milk was collected from a cow with known tuberculosis of the udder. Portions of this were used for control experiments, and the remainder was passed through the tubes of the electrical apparatus at different velocities and with differences in the amount of current (Experiments 88, 89, 91, and 99), and the resulting sample was in each case inoculated into the groin of guinea-pigs. The control guinea-pig developed well-marked tuberculosis.

Experiments 88 *and* 89.—In these experiments the conditions of treatment were such that we fully expected that the complete destruction of the *B. tuberculosis* would not be effected, and the results proved this, for inoculation of a portion of this milk into guinea-pigs brought about definite tuberculosis in these animals.

Experiment 91.—The remainder of this sample was re-treated under more satisfactory conditions, and the inoculated guinea-pigs remained free from tuberculosis.

Experiment 99.—In case the second treatment should also fail, a third treatment was carried out, but the results were naturally similar to those of Experiment 91.

After much work we were able to establish a standard method of treatment, which had to be varied only slightly under different conditions of the milk, etc., and in the later experiments, which we now record, one passage through the apparatus has been sufficient to give satisfactory results.

(*b*) A cow was selected, known to be tuberculous, as determined by previous examination of the milk, and a litre sample of milk obtained. This was thoroughly mixed, and divided into two equal parts, one portion of which was electrically treated, the other portion remaining untreated. The "treated" and "untreated" portions were then dealt with as follows: 500 c.c. of each were taken and centrifuged as ten separate 100 c.c. samples; the cream and deposit of each 100 c.c. were then injected into guinea-pigs, five with the deposit and cream from untreated milk, and five with the deposit and cream from the treated milk. At the end of the necessary period the animals were killed and examined, with the following results:

TABLE SHOWING DESTRUCTION OF TUBERCLE BACILLI OCCURRING NATURALLY IN MILK.

Untreated.			Treated.		
Guinea-pig	No. 1.	Tuberculous.	Guinea-pig	No. 1	All were killed and examined most minutely, but no trace of tuberculosis could be found.
,,	No. 2.	,,	,,	No. 2	
,,	No. 3.	,,	,,	No. 3	
,,	No. 4.	,,	,,	No. 4	
,,	No. 5.	,,	,,	No. 5	

Thus, there is definite evidence of the destruction of all tubercle bacilli, and this under conditions of infection not likely to be met with in industrial practice. It will be noticed that the milk was the product of one tuberculous cow, whereas the milk-supply of a dairy or sterilizing depot is the mixed milk of many cows, with, therefore, a corresponding reduction in the relative number of tubercle bacilli.

2. Experiments on Artificially Infected Milk.

1. A sample of milk was copiously infected with an emulsion of living bovine tubercle bacilli. After the milk had been thoroughly mixed, two control animals were inoculated. The remainder of the milk was then treated, and a further two animals injected with the treated milk. The results were as follows: (*a*) The animals inoculated with untreated milk developed tuberculosis. (*b*) The animals inoculated with electrically treated milk showed no signs of tuberculosis.

2. A sample of milk was sterilized by steam in the autoclave, and afterwards infected with the caseous glands of a tuberculous guinea-pig. The infected material was added to the milk in the form of an emulsion made by the aid of a mortar. This artificially infected milk was then electrically treated, and guinea-pigs inoculated before and

after treatment. The result of inoculation was as follows: (*a*) The guinea-pigs inoculated with untreated infected milk developed well-marked tuberculous lesions. (*b*) The guinea-pigs inoculated with infected milk, after electrical treatment, showed no sign of tuberculosis on post-mortem examination.

3. Evidence on the Destruction of the Tubercle Bacillus occurring in Routine Practice.

During the testing of a larger commercial type plant further evidence was obtained as regards the destruction of tubercle bacilli. Deliberately infected milk was not used, for the apparatus was built in ordinary dairy premises, but on several occasions the untreated milk was found to be tuberculous and the corresponding sample of treated milk was non-tuberculous. The technique was the usual, namely, the injection into guinea-pigs of the cream and deposit from 100 c.c. of centrifuged milk, both before and after treatment.

TABLE SHOWING THE DESTRUCTION OF TUBERCLE BACILLI BY COMMERCIAL TYPE ELECTRICAL APPARATUS.

Date (1914).	Untreated Milk.	Electrically Treated Milk.
January 31 ..	Tuberculous	Inoculated guinea-pigs were killed, and on post-mortem examination showed no trace of tuberculosis.
February 10 ...	,,	
,, 11 ...	,,	
,, 16 ...	,,	
,, 24 ...	,,	
March 10 ...	,,	
,, 14 ...	,,	
,, 24 ...	,,	

THE CONTROL OF SECONDARY INFECTIONS IN TUBERCULOSIS.

By R. PROSSER WHITE,

M.D., M.R.C.S.,

Consulting Physician and Dermatologist to the Royal Albert Edward Infirmary, Wigan; Author of "Catarrhal Fevers, commonly called Colds," and "Occupational Affections of the Skin."

The synergy and antagonism of pathological organisms when implanted on the human tissues is but little understood and explored, despite our increasing knowledge of bacteriology. Their influence for good and evil must in the future demand increasing attention. Unfortunately, the untoward effects of a supervening infection upon a pre-existing diseased condition is a matter of everyday clinical experience.

In many cutaneous affections this well-known factor so aggravates and alters the original lesions as to render them almost unrecognizable, and greatly complicates their cure. Secondary infections are now receiving an absorbing and most necessary attention throughout the battlefields of Europe. We are fairly well armed when fighting against a single infection, be it tetanus or tuberculosis; in either case specific treatment is usually effective. For example, let us take the so-called cold or tuberculous abscess, whether in the psoas region or in the hip-joint. The prognosis in either case is almost invariably favourable. Under modern methods and expert care the abscess can be evacuated, while rest and Nature perfect the cure. Picture the same abscess with the superadded inoculation of pyogenic germs: new toxins flood the lymph channels, and possibly the original pathogenic organisms are roused to greater activity. At any rate, it requires little clinical acumen, or extensive experience to appreciate the serious risks of such a complication, which until recent years was treated with almost casual indifference, and, needless to say, generally with disastrous results.

Are we not approaching the time to demand similar safeguards in all, or at any rate the majority of, cases of pulmonary affections, especially those of a chronic nature, though the pathological organisms are different and their paths of ingress vary? We often have damaged tissue present as the pathological tubercle, the early conservative reaction of the parts to the tubercle bacillus, possibly in a state of caseation or cicatrization, yet all this may exist latent, inert, inoffensive, with little or no clinical evidence, for years, in the absence of further infections.

Again, take the case of a person who has had one or two attacks of un-

complicated bronchitis; with rest and treatment he recovers, although perhaps there remains some enfeeblement of his defensive mechanism against specific catarrhal germs. By strict isolation and ordinary hygienic measures, such as fresh air, I am satisfied I have avoided subsequent attacks in these patients indefinitely. Surely the physician, in his sphere of influence, should emulate the ambition of the surgeon, and the minute details of the bacteriologist, who, with such brilliant success and untold advantage to humanity, preserve their culture media free from further contamination. The surgeon has numerous pitfalls to avoid—the air, the skin, his implements, and incidentally his mouth and his nose. The physician, when supervising the chronic bronchitic, asthmatic, or consumptive, has practically only one—the infective carrier, whether he be visitor or attendant. How few realize its importance! The following incident amply exemplifies my contention: A young man is suffering from chronic pulmonary tuberculosis, and is undergoing the usual hygienic régime of rest in bed, open windows, etc., prescribed by his doctor, under the supervision of a consultant. Meeting the father of the invalid, I inquired how the lad was progressing. He replied that, until a few days ago, his son was improving steadily, with a gradually lowering temperature and less cough. Unfortunately, during the last few days the youth had contracted a cold, and was much worse, with heightened temperature, profuse expectoration, and the usual symptoms of a relapse. I asked the father how he accounted for his son's cold. He said he could not understand it, as the lad had never been out of bed, and no alteration had been made in his treatment or surroundings. On further questioning, the father admitted that lately he himself was suffering from a severe cold, and, as was his wont, continued his frequent and prolonged visits to his son's bedroom. To my mind here was the cause of the lad's relapse; but how is one to explain the further statement of the father, "that he had never been warned of the danger of communicating an infective cold to a person suffering from pulmonary tuberculosis"?

Acting upon the suggestion of our esteemed Editor, I communicated with a number of the superintendents of our British sanatoria, requesting information upon the two following points: (1) Are infective colds common in sanatoria? (2) What precautions are adopted to avoid carriers conveying this infection? The answers to the first question are practically unanimous, and show that colds are practically non-existent, unless introduced from outside. "They are usually brought in by visitors, and occasionally a mild epidemic occurs during the first or second week after the new admissions." One or two answers emphasized the special risk the inmates run from imported infection. The general freedom from this scourge renders them less resistant, as

their immunity is decreased by the absence of the protection afforded by the continual recurrent vaccination which takes place in the constantly exposed outside public. The rapidity with which "colds" spread, and their unhappy consequences, if they do obtain access to these resorts, as pointed out by others, rather favours this view. The answers to the second question show a wide divergence, and the practice and regulations vary greatly in the different institutions. Evidently the open-air régime practised is considered to be in itself, by the majority of the medical superintendents, a sufficient protection. About half of the replies state that "no precautions are taken." Of the remaining half, all take active measures of some kind, and a few adopt stringent precautions, such as the following: "Very few visitors are allowed, and patients are warned not to group together." In some instances printed visiting permits contain the following directions: "Persons suffering from influenza, common cold, or other infectious ailments, are urgently requested not to visit patients;" other superintendents say, "We are as careful as it is possible to be that no visitor with a cold enters the sanatorium, and immediately isolate any visitor, patient, or member of the staff, who develops such a cold."

I am very grateful for this information, and have ventured to select the above replies for publication. At first sight the differing attitudes adopted by the medical officers in charge, all experts in their subject, may appear startling, but, reading between the lines, I rather infer that there is no conflict either in theory or view, but rather an admission of the difficulties which surround the practical carrying out of methods of prevention.

Summing up the whole controversy, one rather concludes that the question resolves itself into: How far have we the right, or are we justified in urging and enforcing all the known and proper steps to safeguard from this infection our patients, whether they be in sanatoria, in their homes, or the public generally in its ordinary intercourse and avocations? This can only be decided after the freest discussion and consideration. At present it seems that each practitioner is a law unto himself; but, surely, until we shall learn how to establish individual immunization against the secondary infections of common colds, influenza, etc., it is our duty to insist upon effective air-therapy and strict isolation of carrier and patient.

RELATIVE IMMUNITY IN TUBERCULOSIS, AND THE USE OF TUBERCULIN.[1]

By the late E. L. TRUDEAU,

M.D.,

Medical Superintendent of the Adirondack Cottage Sanitorium, Saranac Lake, New York.

In the issue of July last of The British Journal of Tuberculosis there appeared a lengthy article by Dr. E. S. Bullock on "Reflections on Tuberculosis and Tuberculin." Certain statements which it contains appear to me to give so wrong an impression of my views relating to immunity in tuberculosis that I am obliged to ask for a little space to make a "confession of faith" in this respect. A brief statement will suffice to make my position clear. I have always been, and am still, an optimist, and in spite of advancing years—now, alas! numbering sixty-six—and several long periods of illness, take as keen an interest in life and in the problem of tuberculosis as I ever did. My friends and associates, I think, can bear testimony to this.

Nothing has occurred to diminish my faith in the value of tuberculin treatment. It is a faith which has been manifested by my continuing the use of tuberculin uninterruptedly in my private practice and also in my work at the Adirondack Cottage Sanitorium. I have employed tuberculin ever since it was discovered, and through all the long years I have stood nearly alone in my medical environment in its advocacy. I believe that, if skilfully used, tuberculin stimulates the defensive resources of the organism and is a valuable adjunct to treatment in many cases. But I see no reason why continued research should not in time give us a better sensitizer than tuberculin. Though I cannot now work at this problem myself any longer, the proof that my interest and faith in the possibilities of continued laboratory work are undiminished is shown by my unremitting efforts to furnish facilities to enable my associates to continue their researches in this direction.

I believe thoroughly in *relative immunity* in tuberculosis. Why should I not, when I was one of the first in the United States of America to demonstrate this immunity in animals. This was as early as 1893. I showed that tuberculin produced a reaction in the eyes of my previously inoculated rabbits which did not occur in the controls. Later, and about the same time as de Schweinitz, Pearson and Gilliland, and others, were working at the subject, I made experiments which proved that the living affords much better protection than the dead bacillus. But this relative protection is not a *real immunity*, but an

[1] Since this article was written Dr. Trudeau has passed away. A memorial sketch, prepared by Dr. S. Adolphus Knopf, will appear in the next issue of this Journal.—Editor B.J.T.

increased resistance to superinfection. The relative immunity produced by implantations of bacilli in the human being and by small inoculations of attenuated bacilli in guinea-pigs is an increased resistance, but it is not a *real immunity*. It does protect the human subject, no doubt, to a greater or less degree, from reinfection from within and from without, but it is not a *real immunity*, for the human subject can die of such reinfection, and the animal always does die of it, even though death be deferred.

What I mean by *real immunity* is an immunity such as occurs in small-pox and in other infectious diseases—that is, an immunity which is shown by the fact that after the disease has been entirely cured, any amount of exposure to the infection will not reproduce it. I know such an immunity is not attainable experimentally in tuberculosis, and I don't think it ever will be attained.

My faith in this belief is strengthened by a consideration of what takes place in syphilis. Syphilis and tuberculosis are chronic infections which have many points in common, and our recent knowledge shows us that no real immunity is attainable in syphilis, although, as in tuberculosis, the victim is protected to a certain degree against reinfection. When a man has once had a chancre, no amount of exposure will produce an initial lesion like it, and yet the individual certainly cannot be said to have a real immunity against syphilis, as it continues its development in the organism and ultimately may kill him. Even more convincing is the fact that if, through treatment, every spirocheta in the living body is destroyed, and the man may be said to have recovered completely by all the applied tests, he will, if exposed to infection, develop the initial lesion, and the disease may run its course as if he had never had it. This has been proved in the monkey.

In tuberculosis, as in syphilis, a relatively immunity exists only as an increased resistance to superinfection. No matter how thoroughly the human being may recover from his tuberculosis, he has not, by the fact of having had the disease, acquired any real immunity to it as is the case in small-pox, but may become reinfected and die of tuberculosis just as if he never had had it.

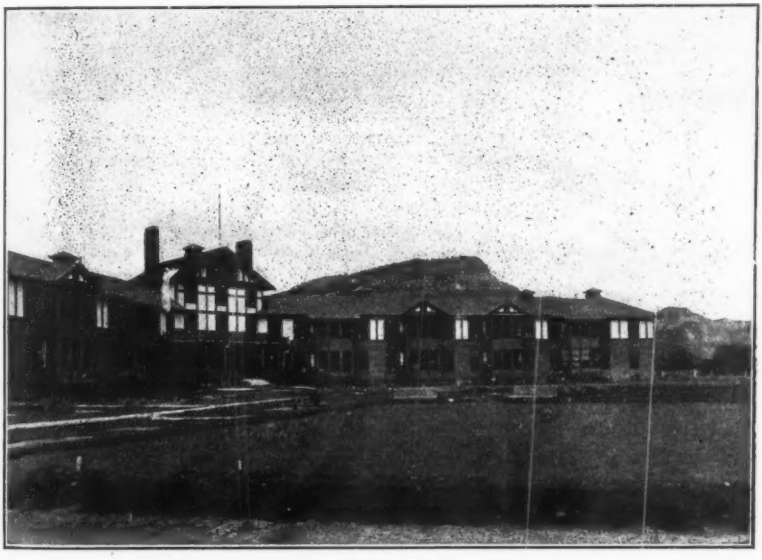
My faith in the possibilities of chemotherapy for tuberculosis is based simply on what Ehrlich has demonstrated as possible in syphilis —namely, that a chemical compound could be discovered which killed the germ without injuring the cell. The objection made that the tubercle has no vessels and therefore cannot be reached by chemotherapy seems to me of little weight, in view of the fact that tubercles can be stained in the living animal by certain aniline dyes without any injury to the other tissues of the body. I see no reason why what has been accomplished in the treatment of syphilis should not be attained in tuberculosis, and such an agent, when properly used, would prove of great value in the treatment of this disease.

INSTITUTIONS FOR THE TUBERCULOUS.

KING EDWARD SANATORIUM, BRITISH COLUMBIA.

THE King Edward Sanatorium for the Treatment of Pulmonary Tuberculosis at Tranquille, Kamloops, British Columbia, is owned and operated by the British Columbia Anti-Tuberculosis Society. The following particulars have been kindly provided by the Medical Superintendent, Dr. C. H. Vrooman.

The Society was organized chiefly through the efforts of the late



KING EDWARD SANATORIUM, BRITISH COLUMBIA.

Secretary of the Provincial Board of Health, Dr. C. J. Fagan, and in 1907 bought what was known as the Fortune Ranch, situated on the north bank of the Thompson River, ten miles west of Kamloops. The ranch consists of about 250 acres of irrigated land, and over 3,000 acres of leased range land, and is watered by the Tranquille Creek. On the ranch there are about 350 head of beef cattle, and a dairy herd of over 30 milch cows. This, with about 10 acres of orchard and garden,

forms a very important auxiliary to the maintenance of the sanatorium. When first opened in 1907 the sanatorium remodelled some of the old farm buildings, and built some cheap shacks, and gave accommodation for about thirty patients. In 1910 the new main building, shown in the accompanying illustration, was opened, and in 1912 an administration building and a sleeping pavilion were added, so that now there is accommodation for 100 patients. While originally only intended for incipient cases of pulmonary tuberculosis, the sanatorium has been forced, because of lack of other accommodation in the province, to take in a large number of advanced cases. Plans have been prepared, and as soon as the necessary funds can be raised a 100-bed building will be built for these advanced cases. The sanatorium refuses no patient who has been a *bonâ fide* resident of British Columbia for six months. Those able to pay for private wards are charged $15 per week, but no patient is turned away because of inability to pay. The maintenance is made up from several sources. The Provincial Government gives a *per capita* grant of $1 per day for advanced cases, and 53 cents per day for incipient cases. Indigent patients coming from organized municipalities are paid for at the rate of $1.25 per day by the municipalities. At least a third of the patients come from unorganized districts, and are neither able to pay themselves nor can they be charged to a municipality. It is for the maintenance of these patients that the Society appeals for public donations from time to time. While the accommodation is not at all adequate to the needs of the province, still, the institution has been doing a great deal of pioneer work in teaching that tuberculosis can both be prevented and cured. Situated as it is in the dry belt of British Columbia—the annual rainfall averages only 10 inches, with a maximum amount of sunshine, 1,994 hours being the average per year—this institution is in an almost ideal spot for the treatment of tuberculosis. Owning such a large acreage of agricultural land, the farm colony idea of treatment of discharged patients can gradually be adopted. Though somewhat isolated, the sanatorium is complete within itself. There is a small but fairly well equipped laboratory, and the institution has its own electric light and water plant, which not only supplies the sanatorium, but all the farm buildings.

NOTICES OF BOOKS.

A POPULAR TREATISE ON TUBERCULOSIS.

TUBERCULOSIS is a medico-sociological problem, and for its solution there must be loyal co-operation between members of the medical profession and leaders of public thought and action. The first essential is reliable knowledge. Dr. A. J. Jex-Blake has very successfully accomplished the difficult task of providing an account of tuberculosis and the measures necessary for its prevention and arrest in a form which can be readily understood by an intelligent non-professional reader.[1] In a series of well-arranged, simply expressed chapters the essentials of the tuberculosis problem are outlined. Commencing with an historical outline and a description of the tubercle bacillus and the lesions to which it gives rise, the handbook describes the nature of predisposition and immunity, indicates the channels of infection, and provides an account of tuberculous disease as met with in different parts of the body. Statistical data are presented, the guiding principles of prognosis indicated, and, after an account of sanatorium treatment and the employment of tuberculin, a concluding chapter is devoted to the consideration of preventive measures. Dr. Jex-Blake does not hesitate to introduce controversial matter and to indicate his own views. Thus, in regard to the much-discussed question of bovine infection in early life, the following statement appears: "Acquired immunity to tuberculosis is a valuable asset to children of the present day. It may be acquired by a mild infection with tubercle bacilli of either the human or the bovine type. Now, there can be no doubt that the bovine type of bacillus is much less virulent to human beings than the human type. Hence, if children are to be infected with tuberculosis, it is clearly better that they should be infected with bacilli of the bovine rather than the human type. The circumstances of daily life being as they are at present, this infection with small doses of bovine bacilli is normally, or even naturally, brought about by the consumption of raw milk and other fresh dairy products. Many scores of millions of gallons of milk containing bovine tubercle bacilli must be consumed annually in Great Britain. Considering the quantities in which such milk is consumed, one must admit that the number of instances in which it gives rise to crippling or fatal forms of tuberculosis in infants and children is comparatively small. Tuberculous milk is commonly regarded as an unmixed curse in the community; but if the line of argument developed above is sound, it would seem that such milk is not without its advantages. A miid milk infection with bovine tubercle bacilli conveyed in milk may protect the adolescent or adult against infection with the more virulent bacilli of the human type in later years." The author

[1] "Tuberculosis: A General Account of the Disease, its Forms, Treatment, and Prevention," by A. J. Jex-Blake, M.D., F.R.C.P. Pp. viii+231. London: G. Bell and Sons, Ltd., York House, Portugal Street, W.C. 1915. Price 2s. 6d. net.

perpetuates the unsatisfactory designation, "phthisis," which is to be regretted, although, of course, there is "official" justification for the retention of the unfortunate term. With regard to the use of tuberculin, it is written that "at the present time it seems fair to say that tuberculin is still on its trial, as far as most practitioners of medicine are concerned, and that it has not as yet made good." The chapter on sanatorium treatment opens with the following caustic, but not altogether unjust, pronouncement: "Time was when the sanatorium treatment of consumption meant treatment at a sanatorium. . . . But since the passage of the National Insurance Act of 1911 the terms 'sanatorium benefit' and 'sanatorium treatment' have been used indiscriminately for any sort of treatment, in their own homes or elsewhere, meted out under the Act to patients who are, or are alleged to be, tuberculous. It seems a pity that such a misleading usage of terms was ever sanctioned." The book is one of the best popular expositions of tuberculosis ever written. It is based on wide reading, extensive personal study and clinical experience, and throughout evidences the working of an open mind. For tuberculosis officers and others whose duty it is to deliver lectures or provide systematic instruction regarding tuberculosis, the book will be of the greatest service.

THE STUDY OF X RAYS.

The discovery and study of X rays have opened new kingdoms to the physicist and the physician. Both in diagnosis and treatment X rays are rendering invaluable service. And now it would seem that we are about to unlock new powers by an increasing knowledge of means for the development and application of radiations from various radio-active bodies. A valuable treatise on the subject, by Drs. Hector A. Colwell and Sidney Russ, has recently been published, and should be in the hands of all interested in this new field of research and practical radio-therapy.[1] The book summarizes the chief facts which have been established in regard to the nature, physical properties, and effects, of X rays and the rays from radium, on the living cells of the body. Part I. deals with theoretical considerations and practical applications, and will be of much value to those taking up original investigations. There are lucid chapters on Röntgen rays and secondary X rays, their nature and transmission through matter, and the ionization they produce. There are also sections on the radiations of radio-active bodies and their relative ionizing and penetrative powers, the disintegration theory of radio-activity, and methods of measurement. Part II. will be of special interest to medical practitioners, for here are described in detail the effects of radio-active emanations on biological processes and the various tissues of the body. Their action in producing and apparently procuring arrest of malignant disease offers a wide field for further inquiry. The results already obtained augur well for the establishment of a rational basis of radio-therapy. This monograph is one of the

[1] "Radium, X Rays, and the Living Cell." With Physical Introduction. By Hector A. Colwell, M.B. (Lond.), D.P.H. (Oxford); Late Assistant in the Cancer Research Laboratories, Middlesex Hospital; and Sidney Russ, D.Sc. (Lond.), Physicist to the Middlesex Hospital. Pp. x+324, with 2 plates and 61 figures. London: G. Bell and Sons, Ltd., York House, Portugal Street, W.C. 1915. Price 12s. 6d. net

most notable and suggestive of modern pioneer works. It is written in lucid language, which every reader will appreciate, and in arrangement, form, and presentation of a difficult subject, the authors have achieved conspicuous success. The work is admirably got up, the type being excellent and the paper first-class, and the illustrations, several of which are in colours, have been prepared with painstaking, conscientious care. At the end of each chapter is a bibliography. We have nothing but praise for this valuable book.

Dr. G. W. C. Kaye has written a serviceable Introduction to the Study of X Rays.[1] Its aim has been to supply a concise account of such present-day methods and apparatus as appear valuable or novel, the descriptions of which lie scattered in numerous journals. The work deals with the development of theory as well as the conduct of experiments, and traces the chief events and historical trend of Röntgen's world-famous discovery in 1895 down to the close of 1913. The author expresses the hope that his book will be acceptable, not only to the student of physics, but to those having general scientific interests, "and particularly to the members of the medical profession, most of whom are keenly alive to the possibilities of the rays which Röntgen has placed at their service." The work is one which can unreservedly be recommended to medical practitioners. The first few chapters describe the phenomena of a discharge-tube, the nature and properties of cathode, positive, and X rays, the development of the X-ray bulb, and high-potential generators, and the methods of measuring intensity. There are also chapters on the nature of X rays and secondary rays, and interference and reflection of X rays, and there is a serviceable section on practical applications. A series of appendices contain technical data. The numerous figures add much to the value of the book. It is just the handbook which medical practitioners using X rays for diagnosis and treatment will know how to appreciate, for it provides reliable guidance regarding matters which only the scientific physicist can authoritatively expound, and yet respecting which clear views are essential.

MANUALS OF PATHOLOGY.

Professor J. Martin Beattie has written a most practical guide to "Post-Mortem Methods."[2] The work is specially designed to meet all the requirements of medical students and practitioners. It is one which we specially commend to the notice of our readers. There is reason to believe that the resident staffs of hospitals for consumptives and the medical superintendents of sanatoria are not always as enthusi-

[1] "X Rays: An Introduction to the Study of Röntgen Rays." By G. W. C. Kaye, B.A., D.Sc., Head of the Radium Department at the National Physical Laboratory; Examiner in Medical Physics for the Universities of London and Glasgow; Member of Council of the Röntgen Society. Pp. xix+252, with 97 figures. London: Longmans, Green and Co, 39, Paternoster Row, E.C. 1914. Price 5s. net.

[2] "Post-Mortem Methods." By J. Martin Beattie, M.A., M.D., Professor of Bacteriology in the University of Liverpool; formerly Joseph Hunter Professor of Pathology in the University of Sheffield. Pp. x+231, with 8 plates and 3 figures. Cambridge: The University Press. 1915. Price 10s. 6d. net. It is a volume in the "Cambridge Public Health Series," issued under the general editorship of Dr. G. S. Graham-Smith and Mr. J. E. Purvis, M.A.

astic as could be desired in regard to pathological investigations. It cannot be too often insisted that the surest basis for clinical work is an extensive acquaintance with pathological conditions, especially as evidenced in the post-mortem room. Professor Beattie's work is one of the best handbooks to post-mortem room technique and interpretation ever published. It contains explicit directions regarding the conduct of a section and the examination of the various organs and tissues. The recommendations are clearly based on long experience and a thorough perception of the practical aims which should be kept in view. The value of the book is considerably increased by the presence of a number of illustrations taken from actual photographs. There is a good chapter on post-mortem examination for medico-legal purposes. A particularly serviceable section is that which deals with bacteriological examination, and this should be of much assistance to medical practitioners, both at home and abroad, and to those on active service with the troops. An Appendix contains guidance as to the preservation of specimens for museum purposes and microscopical examination.

Another work likely to be of special assistance to many of our readers is the new edition of Professor Abbott's well-known handbook on "Bacteriology."[1] This is substantially a new work. The volume has been revised, recast, and thoroughly brought up to date, and now forms a most effective and complete manual. Conciseness, clarity in expression, and a clear understanding of the needs of the student have been governing forces in the preparation of this thoroughly effective volume. The section upon the physiological function of bacteria has been considerably extended, and new matter has been added dealing with hæmolysis, complement-fixation, and Ehrlich's conception of the reactions of immunity. A chapter is devoted to tuberculosis and modes of infection: location of bacilli in tissues, preparation of cultures, microscopical appearances, variations of the organisms, and susceptibility—all receive consideration. There is a useful section on organisms resembling the tubercle bacillus. Some excellent illustrations show actinomycotic-like development of the bacilli of tuberculosis when experimentally introduced into the rabbit by intravenous injection of suspension of the organism. The whole is admirably got up and liberally illustrated.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

The Oxford Medical Publications are now known and read wherever the English language is used. One of the latest additions to the series is the fine "Encyclopædia of Medical Treatment," edited by Dr. W. Langdon Brown and Mr. J. Keogh Murphy.[2] It is a monumental

[1] "The Principles of Bacteriology: A Practical Manual for Students and Physicians." By A. C. Abbott, M.D., Professor of Hygiene and Bacteriology, and Director of the Laboratory of Hygiene in the University of Pennsylvania. Ninth edition, thoroughly revised. Pp. 649, with 113 illustrations, 28 of which are colours. Philadelphia and New York: Lea and Febriger, 706-710, Sansom Street, Philadelphia, Pa., U.S.A. 1915 Price $2.75 net.

[2] "The Practitioner's Encyclopædia of Medical Treatment." Part I.: Methods of Treatment. Part II.: Agents in Treatment. Edited by W. Langdon Brown, M.D., F.R.C.P., Assistant Physician to St. Bartholomew's Hospital, and Physician to the Metropolitan Hospital; and J. Keogh Murphy, M.C., F.R.C.S., Surgeon to

work, and is admirably designed to meet the requirements of the busy practitioner desirous of possessing authoritative and up-to-date guidance in the practical matters of the healing art. There are no fewer than ninety-six different contributors. The introduction by the Regius Professor of Physic in the University of Cambridge is not only a suggestive and stimulating essay, marked by rare literary charm, but is a discourse on the true spirit and purpose of scientific medicine and rational therapeutics. The individual sections cover a wide field, and the volume is a large and handsome one, but the information afforded is just such as the practitioner desires and requires. It should also be noted that there is a very complete index, extending over eighty-seven pages, with three columns to each page. There is a good section on tuberculosis contributed by Dr. Clive Riviere, in which hygienic-dietetic methods and the use of tuberculin are suitably dealt with, and in various parts of the work the treatment of local tuberculous manifestations receive consideration. Needless to say, the general get-up of the work is such as we are now accustomed to expect from the publishers of the Oxford Medical Publications.

A new edition of the "Encyclopædia Medica,"[1] issued under the general editorship of Dr. J. W. Ballantyne, is now appearing. The first two volumes have recently been published. The first edition was begun in 1897, and completed three years later in nine volumes. The aim was to provide medical practitioners with a complete and authoritative professional library in convenient form, covering the whole field of medical work in a series of elaborate monographs arranged in alphabetical order for convenience in reference. A new edition has been called for, and every subject is being submitted to thorough revision, while many new sections are being added. Many illustrations, including coloured plates, are being supplied. The volumes are to be issued at short intervals. Vol. I. deals with subjects ranging from abattoirs to asphyxia. The list of "Principal Articles" numbers forty-eight. Nearly 100 pages are devoted to the Basle anatomical nomenclature—a particularly useful feature. Vol. II. contains an excellent summary of bacteriology, by Dr. William Scott. A good account of the involvement of bronchial glands is contributed by Dr. A. F. Voelcker. This volume contains valuable articles on the chest and the chest wall. Dr. F. D. Boyd deals with the clinical investigation of the chest, its deformities, and the medical affections of the chest wall; while Professor H. Alexis Thomson discusses injuries and surgical affections. Dr. John Thomson furnishes a luminous article on the "Development and Clinical Examination of Children."

A new edition has recently been issued of Professor Still's "Common Disorders and Diseases of Childhood."[2] Dr. Still's work originally

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the Miller General Hospital for South-East London, and to Paddington Green Children's Hospital. With an Introduction by Sir Thomas Clifford Allbutt, K.C.B., M.D., F.R.S. Pp. xxiii+874. London: Henry Frowde, Oxford University Press; and Hodder and Stoughton, Warwick Square, E.C. 1915. Price 30s. net.

[1] "Encyclopædia Medica." Second edition. Under the general editorship of J. W. Ballantyne, M.D., C.M., F.R.C.P.E. Vol. I.: Abattoirs to Asphyxia. Pp. xv+744. Vol. II.: Aspiration to Chlorodyne. Pp. viii+677. Each with numerous illustrations and coloured plates. Edinburgh and London: W. Green and Son, Ltd. 1915. Price 20s. net per volume.

[2] "Common Disorders and Diseases of Childhood." By George Frederick Still, M.A., M.D. (Cantab.), F.R.C.P., Professor of Diseases of Children, King's

developed out of lectures delivered at the hospitals with which he is connected. The new edition has undergone revision and amplification. Sections have been added on cœliac disease and tuberculosis of the cervical glands. The chapter on "Tuberculosis" is a particularly able exposition. Special attention is directed to the diagnosis of tuberculous mediastinal glands. There are illustrations of tuberculous involvement of the lungs. Dr. Still holds that "under any circumstances cow's milk should be pasteurized or boiled for children at least up to the age of five years, and that this practice is a wise precaution for any period of childhood." The use of goats' milk is advocated, as "it can be given unboiled with exceedingly little risk so far as tubercle is concerned, for tuberculosis is extremely rare in goats." Special chapters are devoted to the consideration of "Abdominal Tuberculosis in Children" and "Tuberculous Glands in the Neck." In the latter, Dr. Still deals with a matter of much practical importance: "Is the child with tuberculous glands in the neck dangerous to other children? In former years I took a light view of the risk of infection from such cases, but I have since seen several instances in which there was strong reason to believe that tuberculosis was conveyed by a patient with tuberculous glands in the neck. The risk, no doubt, is greater where there is an open wound or a discharging abscess; but even where there is no external opening, it is to be remembered that tuberculous glands are frequently associated with unhealthy tonsils and adenoids, which in a certain proportion of the cases have been shown to contain tubercle bacilli. It is therefore intelligible that, by sneezing or coughing, or otherwise, the infection may be conveyed by these children to others. Close association, therefore—for instance, in the schoolroom or bedroom—is to be avoided. There will, of course, be much less risk from association out of doors." There is also an excellent chapter on "Tuberculous Meningitis." The whole book is a most reliable, informing, and practical guide for medical practitioners needing direction concerning the detection and management of physical disorders in infancy and childhood.

Dr. D. M. Macdonald has prepared a practical little manual on prescribing and treatment in the affections of infancy and childhood, which may be warmly commended to young medical practitioners and all called upon to advise in the management of sick children.[1] This pocket manual is a *multum in parvo*. It contains dosage and diet tables, formulæ, a therapeutic index, notes on drugs, hints on dealing with emergencies, suggestions as to the management of maladies in the newly born, and much else. Dr. Halliday Sutherland contributes a somewhat lengthy chapter on "Tuberculin and the Tuberculous Child," and boldly claims that "tuberculin is our most valuable

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College, London; Physician for Diseases of Children, King's College, London; Physician to the Hospital for Sick Children, Great Ormond Street. Third edition. Pp. xvi+845, with charts and illustrations. London: Oxford Medical Publications. Henry Frowde, Oxford University Press; and Hodder and Stoughton, Warwick Square, E.C. 1915. Price 16s. net.

1 "Practical Prescribing and Treatment in the Diseases of Infants and Children." By D. M. Macdonald, M.D., F.R.C.P.E. Pp. 199. London: Oxford Medical Publications. Henry Frowde and Hodder and Stoughton. 1915. Price 5s. net.

adjunct in the diagnosis and treatment of tuberculosis in childhood" —an opinion which but few will endorse.

Medical advisers, students of State medicine, and all interested in the organization and administration of public health, will do well to study Mr. B. G. Bannington's survey of the technique of a public health department.[1] Professor Wallas claims for the volume that it is the first general treatise to be published since "English Sanitary Institutions" was written by Sir J. Simon dealing with modern English public health administration. The work clearly indicates the need for a simplification and codification of our sanitary law, and a thorough reconstruction in relations between central and local government. The book enforces the truth of Professor Wallas's contention that, "even if after the war the recovery of our financial position is to be the sole end of English life, that recovery will require wise expenditure as well as wise economy." The volume starts with historical considerations, explains questions of area and authorities, defines sources of powers, details the nature of duties of the medical officer of health and other officials, discusses protection of food-supply, infectious disease, hospital provision and control, town planning, sanitary supplies and services, voluntary agencies, and the like. There is an informing chapter on "The Control of Tuberculosis." The concluding chapter is entitled "The Need for Reform." The volume is No. 46 of the "Studies in Economics and Political Science," edited by the Hon. W. Pember Reeves, Ph.D., Director of the London School of Economics and Political Science.

The third edition of Sir Pardey Lukis's and Lieut.-Colonel Blackham's useful manual on "Tropical Hygiene" has just been issued.[2] This work has been of much service to workers in tropical and subtropical districts. The Indian Council of the St. John Ambulance Association have distributed copies to officers of the Territorial units now serving in India, and the book is one which medical practitioners, sanitarians, and students of hygiene, will find of practical service. It may well be placed in the hands of all intelligent men whose duties take them to danger zones in hot climates. There is an excellent section on tuberculosis. The statement is made that the disease in India is "advancing by leaps and bounds," and that the "mortality from tuberculous diseases in large Indian cities like Calcutta and Bombay is now considerably higher than that in Glasgow, Birmingham, or Manchester."

Medical practitioners will find the collection of prescriptions issued

[1] "English Public Health Administration." By B. G. Bannington, Inspector of Nuisances, County Borough of West Ham. With an Introduction by Graham Wallas, M.A., of Corpus Christi College, Oxford; Professor of Political Science in the University of London. Pp. xiv + 338. London: P. S. King and Son, Ltd., Orchard House, Westminster, S.W. 1915. Price 7s. 6d. net.

[2] "Tropical Hygiene: for Residents in Tropical and Subtropical Climates." By the Hon. Surgeon-General Sir Pardey Lukis, K.C.S.I., V.D., Hon. Surgeon to His Majesty the King Emperor, Director-General of the Indian Service, etc.; and Lieut.-Colonel R. J. Blackham, C.I.E., R.A.M.C., Hon. Surgeon to His Excellency the Viceroy, etc. Third edition, revised and enlarged. Pp. v + 295, with frontispiece, 52 figures, and table. Calcutta and Simla: Thacker, Spink and Co., Government Place. London: W. Thacker and Co., 2, Creed Lane, E.C. 1915. Price 3s.

by *The Prescriber* of much practical help in dealing with panel cases under the National Insurance Act.[1] The Editor of *The Prescriber* has recently issued an instructive brochure on "Incompatibility in Prescriptions," with a useful alphabetically arranged table of incompatibilities.[2]

[1] "National Insurance Prescriptions: A Series of Typical Prescriptions for Use of Medical Practitioners under the National Insurance Act." Second edition, with Notes on Changes in the B.P., 1914. Pp. 32. Edinburgh: *The Prescriber* Offices, 6, South Charlotte Street. 1915. Price 6d. net.

[2] "Incompatibility in Prescriptions and how to Avoid it." By Thos. Stephenson, Ph.C., F.C.S., F.R.S.E., Editor of *The Prescriber*. Pp. 32. Edinburgh: *The Prescriber* Offices, 6, South Charlotte Street. 1915. Price 1s. net.

PREPARATIONS AND APPLIANCES.

SPUTUM FLASKS.

It is probable that until recently most of the Dettweiler's flasks and other forms of glass receptacles for the collection of sputum in use in this country were made in Germany or Austria. It is well to know that there is no need to depend on foreign skill for the production of conveniences for the service of consumptive or other patients. Chief among the makers of Sputum Flasks in this country is the well-known firm of Messrs. Beatson, Clark and Co., Ltd., medical glass manufacturers, of Rotherham, in Yorkshire. This firm has for long been supplying some of the most excellent and inexpensive forms of flasks to the chief hospitals and sanatoria of Great Britain and our overseas

VARIETIES OF SPUTUM FLASK FOR CONSUMPTIVE PATIENTS.

dominions. The flasks are made of strong dark blue glass, and are fitted with solid non-absorbent rubber plugs or super-nickelled bayonet screw caps. Flasks providing for a wash-through, such as are preferred by some physicians and patients, may also be obtained after the patterns shown in the accompanying illustrations. We can unreservedly recommend these receptacles, for they have stood the test of long wear and tear.[1]

A NOVEL SHELTER FOR CONSUMPTIVES.

The Venetian Shelter is an interesting new type of shelter well suited to meet the requirements of consumptives and other cases undergoing open-air treatment.[1] Venetian blinds being utilized in the construction of the shelter, it is appropriately known as "Venetian." The shelter is well adapted for the use of patients in their own gardens in

[1] An Illustrated Price List of the Pocket Spitting Flasks manufactured by Messrs. Beatson, Clark and Co., Ltd., Rotherham, Yorks, may be obtained on application to the firm.

both summer or winter, and is easily erected. We understand that the shelter has been carefully tested in very wet weather, and has been found to exclude rain even during the heaviest downpour, while at the same time it provides for the free admission of air. The shelter will accommodate a full-sized bed, and leave space enough for a small table and chair. For the Venetian Shelter it is claimed that it always admits a through current of air, and that by the system of Venetian blinds it is impossible for a patient to shut out the air entirely. When the blinds are pulled up, or the lower casements opened, the shelter admits the maximum amount of air and light, being practically open on all sides. In two of the models the blinds can be very easily pulled up by the patient from the inside, and it is possible for the blinds adjoining the bed to be pulled up without the patient getting out. In a third model the lowered casements are easily opened, and can be secured from the inside. The roof of the shelter is made in such a manner that the exhausted air does not accumulate in a cul-de-sac, but escapes through a large aperture. The moderate cost of the shelter should bring it within the reach of sufferers of limited means. It should be remembered also that nowadays sanatorium accommodation is not available for many cases, and some patients do not wish to go into a public institution. In such cases a shelter such as the "Venetian" provides an alternative. We are informed that the "Venetian" shelters have been largely used by medical officers of health.[1]

A NEW FOUNTAIN PEN FOR OPEN-AIR WORKERS.

Physicians and patients and all workers living under open-air conditions will find a fountain pen ranks among the indispensables of their equipment. Of all the many varieties now available, none can surpass the recently introduced NEW POCKET SELF-FILLING WATERMAN'S IDEAL.[2] It possesses all the excellent qualities and patent parts of the ordinary Waterman, but, in addition, it is provided with a most ingenious device for rapid and easy refilling. There is a small lever fitting flush with the barrel, which in no way detracts from the appearance of the pen or interferes with comfort and effectiveness in its use. To fill, all that has to be done is to raise the lever, immerse the nib in the ink, and lower the lever. The whole action is but the work of a moment. The pen throughout is of the highest workmanship. For doctors, literary workers, travellers, as well as for the general public desirous of ease and efficiency, this pen is undoubtedly without a rival. For sailors at sea or soldiers at the front, and for all engaged in national service at home or assisting in any form of work, this new pen will prove a most acceptable present. For doctors and patients in hospitals, sanatoria, and the like, it will be invaluable.

[1] The sole inventor, patentee, and manufacturer is Mr. G. W. Beattie, 189, Upper Richmond Road, Putney, S.W. An illustration of the Venetian shelter will be found in the advertisement pages of the present number of this journal.

[2] The new Lever Pocket Self-Filling Pen can be obtained at prices varying from 12s. 6d. upwards. An illustrated leaflet, giving full particulars, may be obtained on application to Mr. L. G. Sloan, The Pen Corner, Kingsway, London, W.C.

REQUISITES FOR THE SANATORIUM AND THE TUBERCULOSIS PATIENT.

For the systematic grouping and preservation of case-papers, charts, correspondence, and memoranda regarding patients, the COLOUR SYSTEM OF FILES introduced by the Alliance Flat File Company will be found of much service.[1]

Messrs. Allen and Hanbury manufacture an excellent series of THROAT PASTILLES,[2] composed of a special pâte de jujube, pure and palatable, with which is incorporated various drugs, such as morphia, ipecacuanha, opium and belladonna, menthol, cocaine, red gum, chlorate of potash and soda, rhatany, tannin, terebene, heroin, formaldehyde, iodine, etc. These will be of much service in the treatment of tuberculosis and various morbid conditions commonly associated with this disease.

Cod-Liver Oil still maintains its long-established position as an invaluable medicament and nutrient in tuberculous and other conditions of malnutrition. Messrs. Parke, Davis and Co. are supplying an excellent emulsion containing 33 per cent. of the finest Norwegian cod-liver oil, with the hypophosphites of calcium and sodium.[3]

Syrup Cocillana Compound is a pleasant preparation for the alleviation of cough. It contains tinctures of cocillana and *Euphorbia pilulifera*, syrup of wild lettuce, cascarin, heroin hydrochloride, menthol, and compound syrup of squill. It should prove of service in the treatment of cases of tuberculosis of the lungs and respiratory passages.[4]

Messrs. Allen and Hanbury have introduced a number of appliances and preparations which will be found of considerable value in the treatment of tuberculous and other lesions of the respiratory passages.[5] We would specially draw attention to the "LOMBARD" ATOMIZER. This is made of glass, and can therefore be readily cleaned and rendered thoroughly aseptic. It is particularly serviceable for the application of small quantities of concentrated solutions.

[1] Particulars of the various Colour-Classification Files may be obtained on application to the Alliance Flat File Company, 17, Union Court, Old Broad Street, London, E.C.

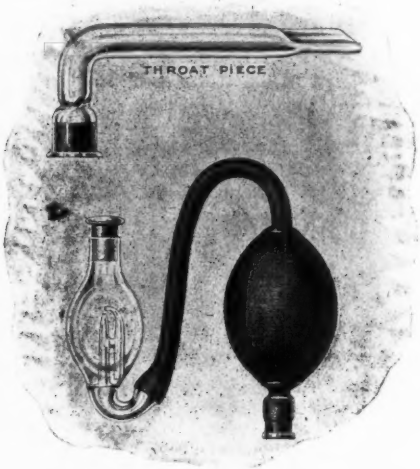
[2] Particulars and specimens of the "Allenbury's" Throat Pastilles will be sent to medical practitioners on application being made to Messrs. Allen and Hanbury, Ltd., 37, Lombard Street, E.C.; or 7, Vere Street, London, W.

[3] A booklet describing the therapeutic uses of Cod-Liver Oil and associated preparations may be obtained on application to Messrs. Parke, Davis and Co., 40, Beak Street, London, W.

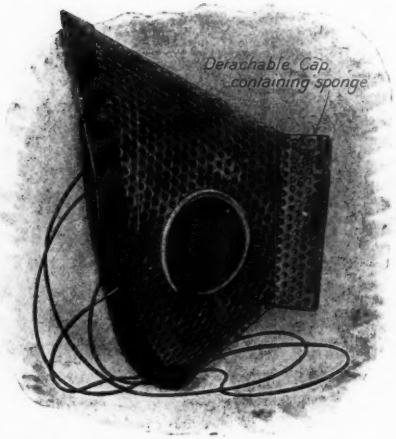
[4] Particulars and specimens of "Syrup Cocillana Compound" will be sent to medical practitioners on application being made to the manufacturers, Messrs. Parke, Davis and Co., Beak Street, Regent Street, London, W.

[5] A copy of "Throat, Nose, and Ear Therapy," giving illustrations and particulars of drugs, sprays, and appliances, will be sent to medical practitioners on application being made to Messrs. Allen and Hanbury, Ltd., 37, Lombard Street, E.C.; or 7, Vere Street, Cavendish Square, W. The price of the "Lombard" Atomizer is 3s., and the price of the "Lombard" Oro-Nasal Inhaler is 1s. 6d.

The "LOMBARD" ORO-NASAL INHALER is one of the best appliances for the treatment of tuberculous affections of the respiratory tract by continuous inhalation. The detachable cap contains a small piece of



THE "LOMBARD" ATOMIZER.



THE "LOMBARD" ORO-NASAL INHALER.

sponge, on which the inhalant is dropped. A large hole is situated on either side, so providing for the admission of air and the dilution of the medicated vapour.

THE OUTLOOK.

EDITORIAL.

THE BRITISH JOURNAL OF TUBERCULOSIS with this issue commences Volume X. Since its foundation in 1907 great progress has been made in the establishment of agencies and the appointment of agents for the adequate conduct of an effective campaign against consumption and other forms of tuberculosis. The general public have been educated in regard to ways and means whereby the disease may be prevented. The State has elaborated machinery for dealing with tuberculosis and rendering aid to the tuberculous. Special tuberculosis officers have been appointed in all parts of the country, and more or less elaborate schemes for the co-ordination of work and the co-operation of workers have been elaborated. Dispensaries, sanatoria, hospitals, and other centres for dealing with tuberculous cases, have been established by State and voluntary enterprise in all parts of the kingdom, commissions and committees have considered and reported on the problem, and many valuable investigations have been undertaken. Statesmen, sanitarians, medical advisers and practitioners of every rank, social service workers and educationists and patriots of all schools, have co-operated to attain a conquest over one of the greatest foes to the health and happiness of mankind. And now the Great War has come. Faced as we are with a struggle for national existence, all other conflicts seem comparatively insignificant. For the sake of the Greatest of Purposes all other plans and pursuits must be allowed to wait. Not a few contend that we must even sacrifice, if needs be, what has already been secured towards accomplishing the arrest of tuberculosis. Certainly the situation is surrounded by far-reaching and intricate perplexities. And for guidance among manifold difficulties a wide, statesmanlike outlook and clear understanding are required, not only regarding medical aspects of tuberculosis, but also its medico-sociological ramifications. And in particular the economic features must receive fullest consideration. But no short-sighted outlook must be permitted. The difficulties of the present must be viewed in the light of future possibilities. The problem of tuberculosis must be studied as an essential part of the Great War problem which faces us as a people. As is indicated in the Symposium which appears in our present issue, the war will make it more than ever desirable that effective means should be available for dealing with tuberculous subjects in all ranks and in every condition of life. How this may be best accomplished we shall hope to be able to indicate in subsequent issues of this journal. Meanwhile we shall be glad to receive particulars of schemes, suggestions regarding the best means for conserving institutions and organizations already established, and any views as to special means and means which may in any way serve to maintain the tuberculosis movement as an effective force in national welfare. We shall count it a favour if medical officers of health, tuberculosis officers, school medical

officers, medical superintendents of sanatoria, hospitals, and other institutions for tuberculous patients, and all secretaries of health associations, after-care committees, and the like, will kindly forward copies of their reports and other publications as soon as issued. The journal represents no special organization or institution, but exists to further the interests of all agents and agencies dedicated to the great purposes of safeguarding and furthering the nation's happiness, health, and efficiency.

MEDICAL RESEARCH.

The Medical Research Committee appointed to serve under the National Health Insurance Joint Committee have issued their first report.[1] The following are the members: The Right Hon. Lord Moulton of Bank, K.C.B., LL.D., F.R.S. (Chairman); Christopher Addison, Esq., M.D., M.P.; Major Waldorf Astor, M.P. (Treasurer); Professor Sir T. Clifford Allbutt, K.C.B., M.D., F.R.S.; C. J. Bond, Esq., F.R.C.S.; Professor William Bulloch, M.D., F.R.S.; Professor Matthew Hay, M.D., LL.D.; Professor F. G. Hopkins, D.Sc., F.R.S.; Colonel Sir William Leishman, C.B., F.R.S.; and W. M. Fletcher, Esq., M.D., Sc.D., F.R.S. (Secretary). The work of the Committee has been made possible by the existence of the "Medical Research Fund." This Fund consists of an annual sum calculated at the rate of one penny in respect of each insured person in the United Kingdom, payable out of moneys provided by Parliament, which has been retained for the purposes of research in accordance with the proviso to section 16 (2) (b) of the National Insurance Act, 1911. For the year 1914 the sum thus available amounted to about £55,000; in normal circumstances it may be expected to increase slightly in each successive year in accordance with the natural growth of the population and the increase in the number of insured persons. The fund for the year 1915, however, will show a diminution owing to the enlistment of insured persons in H.M. Forces. Regulations made by the Treasury assigned to the National Insurance Joint Committee the duty of making regulations as to the manner in which the Fund should be applied for research, and the Joint Committee in due course made provisional regulations on August 20, 1913, and substantive regulations on March 21, 1914; these regulations now govern the administration of the Medical Research Fund. The first members of the Advisory Council and of the Medical Research Committee were formally appointed to serve for three years from August 20, 1913. The regulations lay down that after that period three members of the Committee, to be selected in such manner as the Committee may determine, shall retire at intervals of two years, but shall be eligible for reappointment. The members of the Council are eligible for reappointment after the period of three years. The Medical Research Committee, under the chairmanship of Lord Moulton, began without delay to consider the organization of the new State resources for the advancement of medical knowledge. During the summer and autumn of 1913 the Committee closely studied the

[1] "National Health Insurance: First Annual Report of the Medical Research Committee, 1914–1915. [Cd. 8101.] London: Wyman and Sons, Ltd., 29, Bream's Buildings, Fetter Lane, E.C. 1915. Price 3d.

numerous questions connected with the formation of a national scheme of medical research, and before proceeding to the choice and distribution of particular subjects for research to be initially undertaken they desired to seek approval for the general outline of the policy they were led to propose. A general scheme was prepared and is given in detail in the Report. An important part of the scheme consisted in the establishment of a Central Research Institute, and how this was to be secured is thus indicated: "The policy of limited centralization, with liberal provision for the support of co-ordinated work at local centres, having been approved, the Committee proceeded to make provision for the establishment of a Central Research Institute with a permanent scientific staff, and to frame detailed schemes of research to be prosecuted either centrally or by independent workers outside, or both. After the meeting of December 4, 1913, the Committee negotiated for the purchase of the Mount Vernon Hospital building at Hampstead, with its freehold site and grounds. The structure of this building made it suitable for conversion into an institute for research, and its position appeared to the Committee to give it exceptional advantages in amenity and convenience. Negotiations for the purchase of the building and grounds were proceeded with, and on March 25, 1914, the Committee finally contracted to buy them, upon terms they regarded as favourable to themselves, and paid a first instalment of the purchase-money. In accordance with Article 9 (1) of the Regulations, the Chairman of the Joint Committee appointed Lord Moulton and Mr. Waldorf Astor to be the trustees of the Committee in whom the property was vested. The cost of the freehold site and buildings, to be spread over five years, was £35,000. Plans were prepared in detail for the utilization of part of the buildings as a research hospital, with fifteen to twenty beds, and for the adaptation of the rest of the building to the purposes of laboratory work." The institution, with temporary extensions built in the grounds, is now being used as a military hospital for wounded soldiers, and is known as the Hampstead Military Hospital. The outbreak of war has made the development of schemes for research difficult. The following is the summary regarding investigations planned in regard to tuberculosis: "At Edinburgh, Professor Ritchie has been provided with a whole-time chemical assistant for the study of the chemical influences determining virulence and other characters of tubercle bacilli. This work has been suspended since June for the duration of the war. At Manchester, and later in London, Professor Boycott has been provided with a whole-time assistant for his work upon the chemical conditions of bacterial growth, with special reference to tuberculosis. At Cambridge, Dr. Stanley Griffith has been engaged in whole-time research work on behalf of the Committee, in continuation of his earlier work for the Tuberculosis Commission, and he has been able to extend during the year his studies upon the attenuation and upon the mutations of type of the bacillus. His work has been done in the field laboratories near Cambridge, where the Committee have provided the necessary expenses. Publication has been made of some of his results (*Lancet*, June 19, 1915), and another communication is being prepared for the Press." As to the presence of the bacillus in the blood, Much's granules, etc., it is stated that "most of the work designed under this heading has been postponed, but in London Dr. R. G. Canti, at St. Bartholomew's Hospital, and Dr. Carnegie Dickson,

at the City Road Hospital, have been able to make a beginning of their proposed part-time work on this subject." In regard to the pathology of infection in tuberculosis, "at Dublin, under Professor McWeeney's direction, Dr. W. D. O'Kelly has given whole-time work and Dr. O'Farrell part-time work to the investigation of the types of bacilli in surgical tuberculosis of children. At Edinburgh, Dr. A. P. Mitchell has been able to give part-time work to the continuation of his former studies of bovine and human tuberculosis in children. Dr. W. Campbell has worked upon the generalization in the body of tuberculous infection, but postponed it in June in order to do military work." The rôle of tuberculin in treatment has received consideration: "At Midhurst the Committee have provided clerical and visiting assistance to Dr. Bardswell for his work in following the after-history of cases treated at the King Edward VII. Sanatorium, and this work has been maintained throughout the year. The Committee have made arrangements for similar work, co-ordinated with this, to be done at the Alton Hospital, under the direction of Dr. Gauvain, and also at the Peamount Sanatorium, Dublin. At Edinburgh, under the direction of Professor Lorrain Smith, and with the collaboration of Sir Robert Philip, Dr. James Miller for six months gave part-time to work upon the effects of graduated doses of tuberculin, but has now postponed it to take a military commission." Immunity problems are being studied: "At Oxford, whole-time work by Dr. Ward was begun in Professor Dreyer's laboratory, but postponed after two months. In London, Dr. Teale has been provided with an assistant and some special laboratory expenses for his work on the relations of antitryptic and other chemical factors to the conditions of infection, especially of tuberculous infection." Radiography in the diagnosis of tuberculosis was to have been investigated. As to non-specific treatment: "In Dublin, Dr. Crofton, with an assistant provided by the Committee, worked upon the chemo-therapy of tuberculosis for several months, until commissioned for service abroad." The incidence of phthisis in relation to particular occupations is also under consideration: "A special Investigation Committee was appointed to deal with this subject. Its members are—Dr. Addison (chairman), Dr. Hill, Dr. Moore, and Dr. Brownlee, of the Committee's scientific staff, Dr. E. L. Collis, Medical Inspector of the Home Office Factory Department, with the Secretary of the Medical Research Committee. The Investigation Committee have instituted an inquiry into the incidence of phthisis in relation to occupations at certain selected centres of industry—namely, Birmingham, Bradford, Leicester, Manchester, Sheffield, Cardiff, and Belfast. With the co-operation of the medical officers of health for those boroughs, the Committee are collecting for statistical analysis the returns of phthisis in factory workers, correlated with particulars supplied by the tuberculosis visitors. Special study has also been made of the incidence of phthisis in the boot and shoe trade, and a report has been submitted to the Medical Research Committee giving the results. In this report the possibilities and advantages of a sanatorium in which the patients might be provided with work at their own trade, regulated in amount by their physical condition, are discussed. A second report, upon phthisis in the printing trade, is in course of preparation."

The special report on the occurrence of pulmonary tuberculosis among employees in the boot and shoe industry is issued as a separate

publication.[1] The conclusions are thus summarized: (1) Phthisis is specially prevalent among workers in the boot and shoe industry, as compared with the general population. (2) The individual worker is predisposed to infection by the sedentary nature of his employment, and possibly by the attitude he adopts at work. (3) The infection is probably (*a*) increased by the number of infective workers, and (*b*) favoured by want of light, the presence of infected dust, and inadequate ventilation in the workrooms. Numerous recommendations are made, and a modified form of sanatorium treatment is advised. "Briefly, the scheme is to establish, in connection with the ordinary form of sanatorium, a workplace for the manufacture of boots and shoes. Here consumptive operatives in an early stage of the disease, and convalescing patients, could carry on their trade under medical supervision for such hours as they are able, and earn wages in proportion. The value of work mentally and physically as an integral part of treatment is certain; and at present in sanatoria physical labour of a character unremunerative compared with the earning power possessed by skilled craftsmen is being invented. Such work often deteriorates the character of the young operative and turns him into a loafer."

NOTES AND RECORDS.

America is devoting time and thought and much money to an ingenious and successful conduct of anti-tuberculosis work. The annual observance of Tuberculosis Sunday has done much to educate the public. This season the National Association for the Study and Prevention of Tuberculosis has extended this observance over an entire week, December 6 to 12, each day of the week being devoted to a special aspect of tuberculosis work. "Medical Examination Day" furnished the first effort on a national scale to urge the importance of an annual physical examination for everyone. Plans included an appeal to induce all persons, sick and well, to see a doctor and learn whether they were in good physical condition. The scheme included also the inauguration on the part of factories, stores, and offices, of an annual physical examination for all employees. Anti-tuberculosis associations and other societies and dispensaries all over the country co-operated in furnishing free examinations for those not able to pay a physician. "Children's Health Crusade Day" was planned to interest and instruct school children in healthful living. Special exercises were held, at which lectures, essays, and playlets, were given on the subject of health. This provided also the occasion for launching the Red Cross Christmas seal sale in the schools. The culmination of the campaign was reached in the sixth annual celebration of Tuberculosis Sunday. In the previous year on Tuberculosis Day over 100,000 churches gave attention to the subject of tuberculosis by sermons, talks, and announcements. The Governors of all the States were asked to issue proclamations calling attention to the importance of increasing the knowledge of the public on how to avoid consumption. Clubs, lodges, and societies, were also invited to consider the subject. It is stated that two hundred

[1] "National Health Insurance: Medical Research Committee, First Report of the Special Investigation Committee upon the Incidence of Phthisis in Relation to Occupation—The Boot and Shoe Industry." London: Wyman and Sons, Ltd. 1915. Price 3d.

million Red Cross Christmas seals were printed and distributed by the American Red Cross and the National Association for the Study and Prevention of Tuberculosis. The proceeds went to the support of the fight against tuberculosis among the communities where the seals were sold. The organization of the Red Cross seal sale takes in every State and territory of the United States, including Hawaii, Porto Rico, and the Canal Zone. It was estimated that by December 1 last over 500,000 workers, men, women, and children, would be engaged in the campaign. The sale in 1914 broke all previous records, totalling over 55,000,000 seals, an increase of 22 per cent. over 1913. After deducting all expenses, this left nearly $500,000 for tuberculosis work in this country. The money has been and is being expended by over 2,000 different agencies, who benefited from the sale in amounts ranging from $100 or less to over $25,000. The American Red Cross announces that it will continue its previous successful policy of charging only 10 per cent. of the gross proceeds to State anti-tuberculosis associations, thereby encouraging local work. Is there no possibility of this country, even in war days, accomplishing something on the lines of our enterprising American cousins?[1]

Dr. Sidney Barwise, in his last Annual Report to the Derbyshire County Council, has an interesting section on tuberculosis, in which plans and illustrations are given of the new Derbyshire Sanatorium at Walton, near Chesterfield.[2]

Dr. J. S. Fowler, in a suggestive article on radiography of the thorax in young subjects, deals with the detection of miliary tuberculosis of the lungs, and gives interesting radiographs.[3]

The last Report of the Barlow Sanatorium contains an informing illustration of patients' cottages and a panoramic view of the whole colony.[4]

The last Report of the Canadian Association for the Prevention of Tuberculosis contains illustrations and particulars of the work in the Great Dominion.[5]

[1] Full particulars regarding the work of the American National Association for the Study and Prevention of Tuberculosis may be obtained on application to the headquarters, 105, East Twenty-second Street, New York City (Charles J. Hatfield, M.D., Executive Secretary; Philip P. Jacobs, Assistant Secretary).

[2] "Annual Report on the Health of Derbyshire for the Year 1914," by Sidney Barwise, M.D., B.Sc., M.R.C.S., D.P.H., County Medical Officer of Health. Derby: J. W. Simpson and Sons, Ltd. 1915.

[3] "Clinical Notes on the Radiography of the Thorax in Children," by J. S. Fowler, *Edinburgh Medical Journal*, November, 1915. Edinburgh: W. Green and Son, Ltd. Price 2s. net.

[4] Twelfth Annual Report of the Barlow Sanatorium Association (Incorporated). Chavez Ravine, Los Angeles, California. 1915.

[5] The Fifteenth Annual Report of the Canadian Association for the Prevention of Tuberculosis. Pp. 254. Secretary: George D. Porter, M.B., Bank Street Chambers, Ottawa, Canada.